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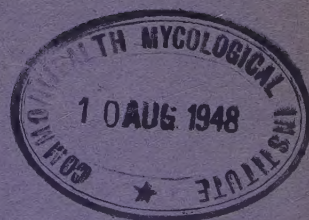
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THE VETERINARY BULLETIN

Vol. 18.]

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[No. 6.

DISEASES CAUSED BY BACTERIA AND FUNGI

VERLINDE, J. D., WINSSER, J., & KRET, A. (1947.) Haemorrhagische diathese en streptococcen-infectie bij honden. [**Haemorrhagic diathesis and streptococcal infection in dogs.**—*Tijdschr. Diergeneesk.* 72. 49-54. [English summary.] 1033

Four case records are given. The first a ten-month-old dog which was destroyed for humane reasons after five days' acute illness characterized by moderate fever and jaundice. P.M. examination revealed a state of haemorrhagic septicaemia and bacteriological examination resulted in the isolation of β -haemolytic streptococci, the cultural characters of which are described. These resembled those of a known human pathogen. The second case, an eight-year-old dog was examined for acute heart disease; there were petechiae on the mucous membranes. After death multiple internal haemorrhages were found. A less pathogenic haemolytic streptococcus than in the first case was isolated from a lung and was judged to be an animal type of streptococcus. The third, a six-month-old dog, died from disease diagnosed as uraemia. Subacute interstitial nephritis haemorrhagic tonsillitis and petechiae in certain of the internal organs were found P.M. A green streptococcus of limited biochemical activity and of no pathogenicity for mice, was isolated from a kidney. The fourth, a bitch, developed a post-puerperal general infection, which did not respond to sulphanilamide. All of five puppies as well as the bitch died and lesions of a generalized infection were found in all. A β -haemolytic streptococcus was isolated.—J. E.

WATTS, P. S. (1947.) The dosage of penicillin in *Streptococcus agalactiae* mastitis and some factors affecting the results.—*Vet. Rec.* 59. 619-621. 1034

Experiments to ascertain the best dosage and spacing of doses of penicillin were carried out in cows affected with *Str. agalactiae* in at least one quarter. The cows were at different stages of lactation and were on farms with different stan-

dards of management. The penicillin, dissolved in sterile distilled water, was injected into the teat canal and six variants of dosage were tried.

The tabulated results are related to clinical condition, severity of infection, stage of lactation, milk yield and age of the cow. A table showing cures against dosage and interval between injections is compiled from the results of many authors.

The following conclusions are drawn:— If a single injection is used the dosage must exceed 100,000 units. In a series of injections 12 hours is the optimum interval between each. If the interval in a series exceeds 24 hours the dose must not be less than 100,000 units. Doses of less than 15,000 units are not efficient. In doses of between 15,000 units and 30,000 units three injections at 24-hour intervals are best but a high proportion of cures results from two injections.—J. D. R.

VAN DRIMMELEN, G. C. (1947.) Case report. A subacute or "atypical" case of anthrax in a bull.—*J. S. Afr. vet. med. Ass.* 18. 71-76. 1035

A case of anthrax is described in a Friesian bull vaccinated against the disease some eight months previously. The animal developed a swelling of the throat which was thought to be a snake bite and was not reported till seven days later when the animal, though neither eating nor drinking, was still strong and active, but was experiencing difficulty in breathing because of the oedema. The temperature was 104°F. but rose to 105.2°F. at which time examination of smears from the ear, the throat and the haemorrhagic nasal discharge revealed no *B. anthracis*. The bull died the following day and *B. anthracis* was demonstrated in smears of blood and lymphatic gland.

van P. considers that many such cases occur in immunized cattle and that asphyxia rather than septicaemia is the cause of death.—J. D. R.

CHAMSY, H. M. (1947.) Sur le pouvoir preventif et curatif des serums anticharbonneux. [**Prophylactic and therapeutic power of anti-anthrax**

serum.]—*Arch. Inst. d'Hessarek*. No. 5. pp. 4-8. 1036

In testing the protective and curative value of anti-anthrax sera on g. pigs inoculated with lethal doses of anthrax spores, it was found that a serum prepared by the use of non-capsulated antigen was protective, and seemed to have some curative value provided the test dose of spores was not too great. The serum prepared by the use of capsulated antigen appeared to give less protection, in that one g. pig died from anthrax when tested with 12 lethal doses of spores, and protection was only given against the lowest dose of spores used.

—U. F. RICHARDSON.

ANGLESIO, D. (1942.) I. Comportamento del peso corporeo della cavia nell'infezione tubercolare sperimentale. [I. Change in body weight of g. pigs infected experimentally with T.B.]—*G. Batt. Immun.* 29. 139-152. [German & French summaries, abst. from English summary.] 1037

The effect on body weight in g. pigs inoculated with equal amounts of human type tubercle bacilli derived from the same parent strain was studied up to the death of the animals. The results were inconsistent; about 71% of the g. pigs gained in weight, 10% were stationary and about 18% lost weight. Thus the difference between initial and final weight readings is no criterion for the severity of the disease, even allowing for other relevant factors.—K. J. S.

CASASSA, M. T., & ORMEA, F. (1942.) Alcune ricerche comparative sull'isolamento del micobatterio del tubercolo da escreti. [Comparative experiments on the isolation of *Mycobact. tuberculosis* from excreta.]—*G. Batt. Immun.* 29. 280-296. [German & French summaries, abst. from English summary.] 1038

Various media were examined; good results were obtained with the slight modification of Noguchi's medium described.—K. J. SINCLAIR.

BOUVIER, G. (1947.) Types des bacilles tuberculeux d'origine bovine. [Types of bacilli in bovine TB.]—*Schweiz. Arch. Tierheilk.* 89. 459-461. [In French.] 1039

The characters are described of human and bovine type strains of tubercle bacilli from cattle grown in Petraghiani media (as modified by Senz and Costil) with and without glycerin.—C. A.

BARELLA, A. (1940.) Ricerche sperimentale allo scopo di conferire al micobatterio del tubercolo un'organolettività per il testicolo. [Experiments on inducing in *Mycobact. tuberculosis* a preference for the testicle as organ of choice.]—*G. Batt. Immun.* 24. 609-658. [French & English summaries, abst. from English summary.] 1040

B. subjected an indifferent strain of *Mycobact. tuberculosis* to 35 passages through a series of g. pig testicles *in vivo*. After several passages the strain was injected into the blood stream of fresh g. pigs, when a tubercular process was frequently established in the testicles, accompanied by lesions in some other organs. It is concluded that a preference for a given organ may be induced in *Mycobact. tuberculosis* experimentally.—K. J. S.

CHOUCROUN, N. (1947.) Antigenic carbohydrate-lipid isolated from paraffin-oil extract of dead tubercle bacilli.—*Science*. 105. 46-47. 1041

From a paraffin oil extract of dead tubercle bacilli two fractions, a "toxic" and a "sensitizing", were precipitated with dioxan. The "toxic" fraction was the chloroform soluble portion of the precipitate and was a polysaccharide ester of mycolic acid capable of producing lesions in the lungs of g. pigs injected intraperitoneally. The "sensitizing" fraction was the part of the precipitate which was insoluble in the usual organic solvents. It contained a large amount of protein and imparted to g. pigs injected with 0.1 mg. intraperitoneally a definite hypersensitivity to old tuberculin.

Immunization experiments were carried out with the two fractions and it was found that the "toxic" fraction gave a better acquired resistance to infection than did the "sensitizing" fraction. Moreover, a more purified "sensitizing" fraction gave a less marked immunity and it was assumed that the immunizing power of the "sensitizing" fraction was due to contamination with the "toxic" fraction.

Using the water soluble portion of the hydrolysate of the "toxic" fraction strongly positive precipitate reactions were obtained with sera from rabbits and g. pigs previously injected with the "toxic" carbohydrate-lipid complex alone, with the serum of a horse immunized with whole tubercle bacilli and with the sera of rabbits immunized with human and avian type organisms.

C. claims that this is the first demonstration that a chloroform-soluble carbohydrate-lipid complex isolated from the tubercle bacillus is antigenic.

—J. DEANS RANKIN.

MIDDLEBROOK, G., & DUBOS, R. J. (1947.) The effect of tubercle bacilli on the antigenicity of a synthetic ester of oleic acid.—*J. Immunol.* 56. 301-306. 1042

Experiments were carried out to investigate the antigenic power of the synthetic ester of oleic acid, called "Tween 80" when injected into rabbits along with killed tubercle bacilli.

Immunization of rabbits with formalin killed tubercle bacilli grown in a medium con-

taining "Tween 80" apparently produced antibodies capable of precipitating this synthetic ester of oleic acid. These immune sera also cross-reacted by producing precipitates of various strengths with other chemically related water soluble fatty acid esters. The sera of rabbits immunized with tubercle bacilli not grown in the presence of "Tween 80" had no precipitating activity on the ester.

The immune sera agglutinated tubercle bacilli grown in the presence of "Tween 80" and also suspensions of tubercle bacilli from glycerine egg slant media, which had subsequently been heated in the presence of "Tween 80", to a much higher titre than tubercle bacilli grown in the absence of the ester. [Previous absorption of the sera with untreated tubercle bacilli does not seem to have been carried out.]

Four rabbits receiving a similar course of inoculations with "Tween 80" by itself produced no antibodies with the above properties.—R. C.

BROWN, E. A., & SLANETZ, L. W. (1947.) **Antiseptic action of glycerite of hydrogen peroxide on *Mycobacterium tuberculosis* (var. *hominis*).**—*Science*. 105. 312. 1043

0.1 ml. of dilutions of hydrogen peroxide in anhydrous glycerol was placed in porcelain cups in the centre of plates of Long's agar medium which had been inoculated, when fluid, with a fine suspension of a five-day growth of tubercle bacilli (average bacterial count 9,000,000 per plate). The plates were incubated at 37°C. for three days and the zones of inhibition measured and compared with those for penicillin, phenol, sulphaguanidine, sulphadiazine, and sulphamethazine. Evidence of bacteriostatic or bactericidal properties was obtained by using plugs from the zones of inhibition to inoculate tubes of Long's broth and Long's agar slopes.

Penicillin produced no measurable effect, glycerite of hydrogen peroxide was bactericidal and all the others were bacteriostatic.

By immersing cubes of inoculated medium in 8% glycerite of hydrogen peroxide for varying times, washing them in Brewer's thioglycolate, and culturing from them it was established that two hours' immersion was necessary to kill the organism.

Tests *in vivo* were carried out on four patients with "cold abscesses" from which tubercle bacilli had been isolated. The glycerite of hydrogen peroxide was applied as a wet dressing 2-6 times daily for 4-11 months. In three cases the healing was complete and in the fourth partial.—J. DEANS RANKIN.

KREIS, B., & RENAULT, J. (1945.) **Sur une cause d'erreur dans l'interprétation des réactions**

intra-dermiques. [A cause of error in interpreting intradermal reactions.]—*C.R. Soc. Biol. Paris*, 139. 538-540. 1044

A small proportion of tuberculous human beings (adult males and children of both sexes) were found to react to the intradermal injection of distilled water and/or of physiological saline, in exceptional cases papular, strongly-congested reaction areas more than 1 cm. diameter persisted for several days. It is suggested that control injections of diluent should be used with each tuberculin injection and that, if reactions to the control injection appear, tests should be interpreted with caution even if the tuberculin produces a much greater reaction than does the diluent. Subjects exhibiting hypersensitivity to diluent are likely to possess some degree of *non-specific* sensitivity to tuberculo-protein.

—J. LOCHIEL MCGIRR.

WIGHT, A. E. (1945.) **Progress and status of cooperative tuberculosis eradication among livestock.**—*Proc. 49th ann Meet. U.S. Live Stk sanit. Ass.*, 1945. pp. 121-125. 1045

W. referred to the results of the TB. eradication campaign in cattle in the U.S.A. By 1945 the incidence was one animal in 2,488, against a figure of one in 48 when the work commenced in 1917. During the second world war there was a setback in progress. He emphasized the economic values of the campaign. In tests on 3,896 cattle with John's disease 6.2% reacted. He discussed the problem of the no visible lesion reactor to the tuberculin test and of avian tuberculosis as a complication of TB. and its control in cattle. —W. R. KERR.

I. WEITZ, B. (1947.) **Studies on *Corynebacterium pyogenes* antitoxin in relation to immunity. I. The production of *C. pyogenes* antitoxin in the serum of normal dairy cows following the inoculation of alum-precipitated toxoid and of a commercial toxoid.**—*J. comp. Path.* 57. 279-285. 1046

II. WEITZ, B., & LANGRIDGE, R. (1947.) **Studies on *C. pyogenes* antitoxin in relation to immunity. II. Effect of alum-precipitated toxoid and vaccine on the artificial infection of the udder of the ewe with *C. pyogenes*.**—*Ibid.* 286-293. 1047

I. An experiment is described to establish the method of administration of *C. pyogenes* toxoid which will give the quickest, highest and most lasting anti-toxin production in dairy cattle. The antitoxinogenic value of alum precipitated toxoid (A.P.T.) is compared with that of a commercial toxoid.

Various dosages and intervals between inoculations were tried and it was found that a dosage

of A.P.T. of 5 ml., 10 ml., and 10 ml. given intramuscularly at ten-day and seven-day intervals gave a high early response which could be maintained by further injections of 10 ml. every two months. All groups receiving A.P.T. showed equivalent responses after the third series of inoculations (160 days). The commercial toxoid was not antitoxinogenic. No ill effects resulted from the injections.

II. Groups of 18 sheep were inoculated intramuscularly with *C. pyogenes* A.P.T., with *C. pyogenes* vaccine, and with a combination of A.P.T. and vaccine. A marked increase in antitoxin level was observed in the toxoid group but not in the other groups.

The three groups and a control group (20 sheep) were inoculated *via* the teat canal with a large inoculum of *C. pyogenes* in one half of the udder and a smaller inoculum in the other half. There was little difference in the type of the disease produced, but there was a difference of incidence. In the heavily inoculated udders of all groups infection reached almost 100%, whereas in the lightly infected only 50% of the controls, 35% of the vaccine and vaccine and toxoid, and 8.3% (1 out of 12) of the toxoid group became permanently infected.

The authors conclude that the large inoculum was too high for testing prophylactics and that A.P.T. may be of some use in protection against *C. pyogenes*-mastitis.—J. DEANS RANKIN.

PLUM, N. (1946.) Om Vaerdien af den makroskopiske Diagnose af de Holthske Processer. [Value of macroscopic diagnosis of *Corynebact. equi* infection.]—*Maanedsskr. Dyrlaeger.* 58. 27-37. 1048

Both Jespersen (1938) and Jepsen [See V. B. 11. 77] studied this infection and concluded that it could be diagnosed with high accuracy by naked eye inspection of the submaxillary lymph nodes, the characteristic site of "Holth's processes".

Plum reports the results of extensive studies on 1,500 specimens of lymph node in slaughter swine. Macroscopic examinations indicated that 857 were infected by *Corynebact. equi*, 345 were tuberculous, 34 were the seat of a pyogenic abscess and 264 were regarded as "doubtful". In checking this by microscopic examination the above figures were verified to the following proportions:—*Corynebact. equi* 90%, TB. 75%, abscess 35% and 50% of the doubtful specimens were still undiagnosed. A 10% error occurred in the macroscopic diagnosis of *Corynebact. equi* infection and a 25% error in that of TB. So it is definitely concluded that macroscopic diagnosis for detecting the former cannot be allowed in meat inspection practice.

As to the value of microscopic diagnosis in

comparison to cultural diagnosis, 241 specimens were examined with rather unhelpful results, a notable proportion of microscopically positive results indicating one or other infection not being confirmed by culture test, but remained doubtful. Microscopical diagnosis of *Corynebact. equi* infection has been officially approved in Denmark.

—J. E.

OTTOSEN, H. E. (1945.) Undersøgelser over *Corynebacterium* Magnusson-Holth specielt med henblik paa dens serologiske forhold. [Studies on *Corynebacterium* Magnusson-Holth with special reference to serological aspects. pp. 119. Copenhagen: Carl F. Mortensen. [English summary.] 1049

The morphological and cultural characteristics and pathogenicity of the organism are described. It is pathogenic for horses and pigs and produces abscesses, lymphadenitis pneumonia and in foals, pyaemia. The disease in pigs closely resembles TB. The organism has been isolated from cow dung, human sputum and from soil, where it may live as a saprophyte. By agglutination absorption tests 217 strains have been divided into six groups, each of which contains one or more types.

Control of the infection by mapping out heavily infected areas by soil sampling, and avoiding them as pasture for horses and pigs is suggested.—A. G. WARREN.

AMMANN, K., & HESS, E. (1946.) Die Banginfektion des Pferdes. I. Mitteilung. [Brucellosis in horses. I.]—*Schweiz. Arch. Tierheilk.* 88. 285-305 & 333-344. 1050

The disease is discussed in conventional terms. Since 1940, 34 positive cases had been examined and treated by the authors. Among 1,000 other army horses, 7% showed a positive agglutination titre. Out of 185 blood samples from suspected farm horses 36% were positive.

Therapeutic vaccination is sometimes useful. Infection from infected cattle herds is mostly acquired *per os*, rarely *via* the conjunctiva. Cattle may be reinfected by horses. Skin lesions may occur in connection with bursitis. Details are given of some of the cases.—C. AHARONI.

GREY, C. G. (1947.) Effects of penicillin on *Erysipelothrix rhusiopathiae* and on mice infected with that organism.—*Vet. Med.* 42. 74-75. 1051

This is largely a résumé of Heilman and Herrel's work. [See V. B. 15. 310.]

G. studied 34 different strains of *E. rhusiopathiae* from swine, turkeys, chickens, mink, man, cattle and from hog cholera virus. He confirmed that penicillin has a germicidal effect on

E. rhusiopathiae *in vitro* and *in vivo* in mice and that the effect *in vitro* varied with the strain.

Fifteen mice, infected by inoculating 0.03 ml. of a broth culture subcutaneously, were given 4,000 units of penicillin over a period of four days (250 units every three hours approximately), treatment being started within one hour of infection; twelve (80%) of the treated mice survived. The 15 control mice died in 3-5 days.

Smaller doses of penicillin failed to protect.

—J. DEANS RANKIN.

SCHOOP. (1943.) Pasteurellose bei Edelfüchsen. [**Pasteurellosis in Foxes.**]—*Dtsch. tierärztl. Wschr./Tierärztl. Rdsch.* 51/49. 145-146. 1052

Pasteurellosis in foxes may be of two types. It may occur as a septicaemia in young animals in which case losses are usually not high. In adult animals the disease is restricted to the lungs. It occurs as a sequel to lungworm infestation (*Eucoleus aerophilus* and *Capillaria plica*) which is controlled when the foxes are kept on properly designed floors of wood slats or wire meshing. Specific antiserum and sulphonamides are useful for treatment.—E. KLIENEBERGER-NOBEL.

MIKULASZEK, E., & RATOMSKI, A. (1945.) Badania serologiczne przy paratyfuszowym ronieniu klaczy. [**Serology of paratyphoid abortion in mares.**]—*Med. Wet.* 1. 39-47. (Abst. from French summary.) 1053

A discussion on the serology of the infection on conventional lines.—J. H.

HANSEN, A. C. (1941.) Et Tilfælde af Andeægsgiftning. Om Aeg Fjerkrækød som Kilde til Salmonellainfektion hos Mennesket. [**A case of duck egg poisoning (salmonella infection) in man.**]—*Maanedsskr. Dyrlaeger.* 53. 301-314. 1054

H. discusses the literature on the poisoning of human beings by salmonella-infected eggs and flesh of poultry, and reports a new instance from South Jutland in Denmark. All of the four members of a farmer's family contracted *Salmonella typhi-murium* infection, after partaking of a duck egg-milk mixture.

The infection could not be traced directly to the eggs, but it was found that on examination the producer ducks had the same infection as was detected in the material from the sick persons. The strain of *S. typhi-murium* isolated was Harkoff's type 2, rarely found in Denmark.—J. E.

KAUFFMANN, F. (1942.) Über polyvalente Immunsereen zur Salmonella-Diagnose. [**Polyvalent immune sera for salmonella typing.**]—*Acta path. microbiol. scand.* 19. 248-261. [In German.] 1055

Typing of the salmonella is considerably simplified by the use of sera polyvalent with

respect to O- and to H- antigens. Three mutually exclusive O- antisera are prepared, OA, OB and OC. These, together with a mixture of all three, OM, are used for the preliminary characterization of any organism. Four mutually exclusive H- antisera, HA, HB, HC and HD and a mixture of all four, HM, are prepared and used to obtain a further degree of differentiation. The methods of preparation of these sera from rabbits are given, and the reactions of the sera with a large selection of salmonella species are tabulated.—R. S.

FIORIO, C. (1942.) La reazione di deviazione del complemento nelle brucellosi. [**The complement fixation test in brucellosis.**]—*G. Batt. Immun.* 28. 737-761. [German & French summaries, abst. from English summary.] 1056

A technique for studying the complement fixation test in brucellosis is described and shown to be effective on experimental sera. The test was performed with three type-specific antigens (*Br. melitensis*, *Br. abortus* and *Br. paramelitensis*) on 208 human sera, of which 63 individuals were definite brucellosis cases. The test was highly sensitive and specific, in a few cases superior to agglutination. The complement fixation test is recommended in the serum diagnosis of brucellosis, for supplementing and confirming the agglutination test. The quantitative side of the test and its possibilities are discussed.

—K. J. SINCLAIR.

BONADUCE, A. (1942.) Sulla termoresistenza delle agglutinine delle brucelle in fase "R". [**Thermal-resistance of the agglutinins of the brucellae in "R" phase.**]—*G. Batt. Immun.* 29. 671-677. [German & French summaries, abst. from English summary.] 1057

The behaviour of the agglutinins of rough strains of *Br. melitensis* and *Br. abortus* was investigated with special reference to the relation previously observed by Pagnini between thermal resistance of the agglutinins and the virulence of the strain concerned. The agglutinins studied were of very low thermal stability. Agglutinins of strains *Br. melitensis* and *Br. abortus* which were avirulent for g. pigs were sometimes thermolabile and sometimes thermostable, those of virulent strains were heat stable in varying degree.—J. S.

EVANS, D. G. (1943.) The protective properties of the alpha antitoxin and Antihyaluronidase occurring in *Cl. welchii* type A antiserum.—*J. Path. Bact.* 55. 427-434. 1058

E. carried out biological tests on g. pigs with three strains of *Cl. welchii* type A, two being hyaluronidase producers, and one producing none. All three strains were found to be equally effective in causing fatal infection.

Protection experiments with these three

strains showed that the efficiency of *Cl. welchii* type A antisera (including British gas gangrene antitoxin (*welchii*)) does not depend on the quantity of antihyaluronidase present.

The results, together with those published previously on θ antihæmolysin, lead E. to conclude that although a protective serum may contain antibodies against the three known antigens of *Cl. welchii* type A, it is the α antitoxin which is of importance in the control of experimental infection in the g. pig.—I. W. JENNINGS.

ADAMS, M. H., HENDEE, E. D., & PAPPENHEIMER, A. M., Jr. (1947.) **Factors involved in production of *Clostridium welchii* alpha toxin.**—*J. exp. Med.* **85**, 701-713. [Authors' summary copied *verbatim*.] **1059**

Maximum production of the alpha toxin by *Cl. welchii* is dependent on the inclusion in the medium of several substances in addition to those required for growth. These factors include: some substance present in enzymatic digests of certain proteins such as casein and gelatine. Glycerylphosphorylcholine and other substances that are present in extracts of pancreas. The use of starch or dextrin as a carbohydrate source in the absence of other fermentable carbohydrates. The omission of any one of these factors from the medium results in a very low yield of alpha toxin. HANKE, M. E., & BAILEY, J. H. (1945.) **Oxidation-reduction potential requirements of *Cl. welchii* and other clostridia.**—*Proc. Soc. exp. Biol., N.Y.* **59**, 163-166. **1060**

There is a limiting value of the oxidation-reduction potential of the medium above which the anaerobic clostridia will not grow. The variation of this value with pH was investigated in the case of *Cl. welchii*, *Cl. sporogenes*, and *Cl. histolyticum*. In each case the limiting value was highest in the neighbourhood of pH 6.4 (*Cl. welchii* + 160 mV, *Cl. sporogenes* + 147 mV, *Cl. histolyticum* + 87 mV). On either side of the optimum pH this limiting Eh value falls, the fall being steepest in the case of *Cl. welchii*. *Cl. tetani* responds unsatisfactorily to the technique used: at pH 6.5 it will grow at Eh + 85 mV but not at Eh + 120 mV: it seems therefore similar to *Cl. histolyticum* in requiring more reducing conditions than *Cl. welchii* or *Cl. sporogenes*.—R. S.

McCLUNG, L. S., & TOABE, R. (1947.) **The egg yolk plate reaction for the presumptive diagnosis of *Clostridium sporogenes* and certain species of the gangrene and botulinum groups.**—*J. Bact.* **53**, 139-147. [Authors' summary copied *verbatim*.] **1061**

A peptone base medium and an egg yolk supplement are described for use in plate culture demonstration of the LV (lecithovitellin) or

Nagler reaction. By use of this medium presumptive identification of the following is possible: *Clostridium perfringens* (*Cl. welchii*), *C. novyi* (*C. oedematiens*), *C. sordelli*-*C. bifermentans*, *C. hemolyticum*, *C. botulinum*, *C. parabotulinum*, and *C. sporogenes*.

WILLEMS, R. (1941.) Au sujet de la nature du mal d'Aiseau (identité probable de cette affection et du botulisme du cheval). [**"Mal d'Aiseau" a disease of horses that is probably botulism.**]—*Acta biol. belg.* **1**, 356-358. **1062**

"Mal d'Aiseau" of the horse was named in 1879 after the Belgian village where an outbreak occurred that was described. From cases of this disease, Marcq, in 1909, isolated a streptococcus similar to that previously recovered by Ostertag from cases of Borna disease, and since then, "Mal d'Aiseau" has been considered to be the same as Borna disease. Arguments are presented in favour of the view that the disease is, in fact, a form of botulism: the syndrome corresponds; no virus, inoculable in series in rabbits, has been recovered from affected horses; in the brain, Joest-Degen bodies and perivascular cuffing have not been detected, but small capillary haemorrhages, such as occur in botulism, have been observed. Urotropin, reported to be of some value in the treatment of Borna disease, is useless in "Mal d'Aiseau". Botulism does occur in horses in Belgium.

The author adds one more point, *viz.* as "Mal d'Aiseau" does not respond to treatment with urotropin, it is not the same condition as Borna disease.—E. COTCHIN.

BROWN, A. M. (1947.) **The oedematiens toxin antitoxin reaction: with special attention to the nature of the sera employed.**—*Brit. J. exp. Path.* **28**, 178-189. **1063**

Oedematiens sera having a normal ratio of antitoxic units *in vivo* to antitoxic units *in vitro* flocculate more rapidly with toxoid than with the corresponding toxin, while sera showing a high ratio flocculate equally readily with both and are thus more suitable as standard sera for the *in vitro* estimation of toxins and toxoids. Serum concentration-flocculation time curves are given for the various sera and discussed. The sera were fractionated by varying concentrations of ammonium sulphate. The fast flocculating antitoxin is precipitated in the lower conc. range, *i.e.*, with gamma globulin. The fast flocculating fraction was not necessarily associated with a high *in vivo/in vitro* ratio of antitoxic units. The antitoxin in the floccules, in floccule suspensions (made by mixing toxin and antitoxin in varying proportions) and in the supernatants was estimated by the peptic digestion method. It was found difficult to

estimate underneutralized antitoxin. Evidence is adduced for the existence of a compound consisting of one unit of toxin with ten units of antitoxin (TA₁₀) formed from a high ratio antitoxin combined with toxin. From mixtures containing a large excess of antitoxin, high ratio *oedematiens* antitoxin has a greater power to combine and flocculate with toxin than has normal ratio antitoxin.—A. A. WILSON.

PIRATININGA, S. N. (1943.) Esporotricose em mular. [*Sporotrichosis in a mule.*]—*Rev. Fac. Med. vet. S. Paulo*. 2. 219–222. [E. sum.] 1064

Skin lesions were observed in a mule none of which were in a suppurative condition. The chief regions of the body affected were the hind limbs and the lips. The animal died some days afterwards. Lesions were present in the subcutaneous tissue and in the muscles. The lymph nodes were inflamed, and degenerative changes had taken place in the liver and kidneys. Intestinal haemorrhages were present.

Stained smears of the skin lesions revealed small capsulated unicellular bodies. Dark colonies were present on Sabouraud's maltose agar. A smear of these colonies revealed conidia and mycelial filaments.

The development of the fungus was followed using the hanging-drop method. The reactions in different media and fermentation tests were recorded. Inoculations were made in g. pigs, two donkeys, one mare and rats.

A comparative study with *Cryptococcus*, *Histoplasma* and coccidia is made at the end of the article.—F. A. ESTEVES.

ALBORNOZ, J. E. (1945.) Primer caso de sporotricosis equina comprobada en el pais. [*Equine sporotrichosis identified in Colombia.*]—*Rev. Med. vet., Bogotá*. 14. 33–42. 1065

A. describes the skin lesions in various stages of development; the lymph nodes of the areas were enlarged. Diagnosis was verified by culture. Treatment with potassium iodide gave good results.—A. ESTEVES.

See also absts. 1087 (bacterial immunity); 1150 (sulphonamide therapy); 1151–1158 (penicillin); 1162 (penicillin and TB.); 1164 (streptomycin and TB.); 1165 (lipids and growth of TB.); 1167 (succinic acid derivatives and TB.); 1170 (sulphonamides and pullorum disease); 1240 (streptococci).

DISEASES CAUSED BY PROTOZOAN PARASITES

STURA, C. A. (1947.) El liquido cefalo raquideo en la tripanosis equina. [*The cerebrospinal fluid in Trypanosoma equinum infection.*]—*Gac. vet., B. Aires*. 9. 132–141. 1068

The method of obtaining a specimen of cerebro-spinal fluid by puncture of the atlanto-occipital joint in horses is described. It is recommended that the trocar used should be 15–20 cm. in length, and 1.5–2 mm. in diameter, and should

GERRING, J. C. (1947.) An unusually high incidence of actinobacillosis in cattle following the burning-off of peat country.—*Aust. vet. J.* 23. 122–124. Discussion p. 124. 1066

A high incidence of actinobacillosis affecting cattle grazing on the peat country of three properties is described, the peat-country having been burnt off severely. The lesions encountered are described and in some cases were very extensive. Most cases responded to subcutaneous injections of sodium iodide, but several cleared up spontaneously. On two of the properties similar trouble had been encountered some years previously after a severe burn off and G. suggests that the ingestion of ash might have produced abrasions in the mucous membrane and permitted the entry of organisms.—D. F. STEWART.

GOLIKOV, N. N. (1944.) Ikterogemoglobinuriya zhvachnykh v Palestine. [*Icterohaemoglobinuria of ruminants in Palestine.*]—*Veterinariya, Moscow*. No. 8–9. pp. 11–12. 1067

This article puts on record a communication from Dr. Freund describing a disease of cattle, sheep and goats which broke out in Palestine in January, 1943, in the neighbourhood of Tel-Aviv. 500 cases were recorded between January and September, and it is suggested that the numbers affected were actually far greater. The disease was characterized by fever, blood-stained milk, jaundice, dark frothy urine and brachycardia, and was at first mistaken for piroplasmiasis, but in view of its contagiousness was later ascribed to an unknown virus. A dark brown discoloration of the organs, such as the liver, spleen and kidneys, was seen at P.M., the last being three times the normal size. Analysis of urine showed albuminuria and the presence of bilirubin. Leptospira were not detected in the tissues.

G. concludes that the disease is the same as that recorded in Russia, which has been shown to be due to a leptospira, and can be treated by the intravenous injection of ammargen [ammoniacal silver nitrate] 1 mg. per kg. body weight, in 1 : 500 solution.—U. F. RICHARDSON.

not penetrate more than 9–11 cm. The composition of normal equine cerebro-spinal fluid is given as:—water 98.6–98.8, sodium chloride 0.58–0.62, potassium 0.015–0.02, calcium 0.005–0.007, phosphorus 0.0028–0.0032, urea 0.025–0.04, glucose 0.06–0.08, albumen 0.02–0.06 and total nitrogen 0.02%, globulin being absent.

In horses infected with *T. equinum* the composition of the fluid varies with the severity of the

infection, but there is an increase in albumen, with the appearance of globulin. The salts are decreased, and glucose disappears. There is an increase of leucocytes from 3-5 cells per cubic mm. up to 1,000 cells, large mononuclear cells and other blood forms occurring in addition to the normal lymphocytes. The cells of Christy also appear.

It is concluded that these alterations indicate damage to the choroid plexus, and the barrier between the blood and the cerebrospinal fluid. This is confirmed in that in a normal horse the injection of trypanblue or acriflavine does not colour the cerebro-spinal fluid, but in a trypanosome subject the dyes appear in the fluid within 3-4 hours.—U. F. RICHARDSON.

CURASSON, M. G. (1940.) Les reactions serologiques dans le diagnostic des trypanosomias. [Serological tests for diagnosis of trypanosomiasis in ruminants.]—*Bull. Serv. zootech. Epiz. A.O.F.* 3. 229-235. 1069

Working with a virulent strain of *T. vivax* inoculated into sheep, goats and cattle, an investigation was made into the value in diagnosis of the various serum tests which have been suggested, based on an increase in the serum globulin and its instability. The serum of infected animals and controls was tested with mercuric chloride, acetic acid, distilled water, lecithin, tannin, formalin, and by the melanin reaction of Henry, and the sero-flocculation reaction of Sicé. None of these tests gave constant results and it is concluded that variations in the serum globulin are little marked in *T. vivax* infections of sheep, goats or cattle.

—U. F. RICHARDSON.

DIAS, V. S., & TEIXEIRA, O. (1946.) Acerca da existência em Portugal do *Piroplasma Caballi*. [*Babesia caballi* in Portugal.]—*Rev. Med. vet., Lisboa*. 41. 256-265. [English summary.] 1070

Records the detection of a *Babesia caballi* infection of horses at Vila Franca de Xira, Portugal, it being considered that the area is an enzootic focus of equine piroplasmiasis, as *Nuttallia equi* infection also occurs there. The article contains descriptions of the parasite, and drawings of it. Attention is drawn to the danger of infection to horses imported into the area, and the necessity of seeking veterinary advice.—U. F. RICHARDSON.

HORTON SMITH, C. (1947.) Coccidiosis—some factors influencing its epidemiology.—*Vet. Rec.* 59. 645-646. 1071

This is a paper read at the meeting of the British Association in 1947.

The influence of temperature and moisture on the sporulation of the oocyst is discussed. Relative humidity of over 90% is necessary for

normal viability and sporulation of *Eimeria tenella*. The death of the host from coccidiosis appears to be related to the massive production of merozoites. Effective sulphonamides such as sulphamethazine, sulphapyrazine and sulphadiazine act on the schizont and inhibit merozoite production. It is the second generation schizont stage which appears to excite the immune response in the host.

Experiments with varying doses of sporulated oocysts indicate that while doses as low as 100 sporulated oocysts will excite some immunizing response it requires doses of the order of 200,000 oocysts to induce a solid immunity in surviving chickens.—D. LUKE.

GOLIKOV, N. N. (1944.) Dezinfektsiya i fizicheskie faktory pri koktsidiozakh sel'skokhozyaistvennykh zuivotnykh. [Disinfection and physical factors in control of coccidiosis in farm animals.]—*Veterinariya, Moscow*. No. 8-9. pp. 37-39. 1072

This article discusses the destruction of coccidial oocysts by chemical disinfectants, which are considered inefficient, and by physical factors such as variations in the supply of oxygen and moisture, and decomposition. [The article is a compilation of the results obtained by other workers, and contains no original observations. It is also not entirely up to date as it states no therapeutic agent is available to destroy the parasites in the host.]—U. F. RICHARDSON.

WICKWARE, A. B. (1947.) Studies on resistance to *Eimeria tenella* infections.—*Canad. J. comp. Med.* 11. 125-130. [French summary.] 1073

It was found, as a result of three trials with 380 chickens, that a relatively high degree of resistance developed after the artificial administration of controlled doses of sporulated oocysts. The losses, however, were such as to discourage the use of this method alone to control caecal coccidiosis and it is suggested that controlled exposure to infection and the use of sulphamerazine or sulphamethazine is a more practical method of preventing the development of this disease.—R. GWATKIN.

KAMPE, Å. (1945.) Ett fall av höggradig sarkosporidiosis hos rådjur. [Advanced sarcosporidiosis in roedeer.]—*Skand. VetTidskr.* 35. 586-592. [Abst. from English summary.] 1074

The flesh from this case was dense and gray-tinted and the cut surface exuded a gray pasty substance. Microscopical examination revealed very advanced sarcosporidiosis (illustrated).

The literature is reviewed and the nature of sarcosporidia discussed.—J. E.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

DE GIORGIO, A. (1942.) Mutazioni dei caratteri del virus rabbico fisso (ceppo Pasteur). [**Changes in the properties of fixed rabies virus (Pasteur strain).**—*G. Batt. Immun.* 29. 205-210. [Abst. from German, French & English summaries.] 1075

de G. studied the properties of fixed rabies virus (Pasteur strain) in 3285th passage obtained from the Anti-rabies Institute at Padua. Data are recorded for incubation period, virulence in respect to different modes of inoculation and changes in the properties of the virus after drying out the spinal cord according to the Pasteur technique. The latter observations enabled de G. to exclude, in the inoculation of human beings, those cord preparations which are definitely inactive and so to facilitate more effective and expeditious anti-rabies treatment.—K. J. S.

ENGEL, L. L., & RANDALL, R. (1947.) **The quantitative estimation of egg and chicken proteins in equine encephalomyelitis vaccines.**—*J. Immunol.* 55. 325-329. 1076

The danger of sensitizing patients to egg and chicken proteins by injection of vaccines prepared from virus cultivated on chick embryo makes it desirable to reduce the non-viral component in such vaccines to a minimum. In order to determine this value, equine encephalomyelitis vaccines were subjected to the quantitative precipitin reaction.

Formolized antigens were prepared from ovalbumin, ovoglobulin, chicken serum albumin and chicken serum globulin, the antigens added to the homologous antiserum and the precipitates analysed for nitrogen by the micro-Kjeldahl method. Standardization curves of the antisera to the four antigens were then prepared. It was found that commercial samples of vaccine contained about 1,000 to 1,600 µg. per ml. of protein nitrogen whereas on purification of the vaccines by means of the precipitin reaction, the total protein nitrogen could be reduced to about 300 µg. per ml.—J. A. NICHOLSON.

GANNUSHKIN, M. S. (1944.) Ob antagonizme mezhd B. caballi i N. equi i gemosporidiyami i virusom infektsionnoi anemii loshadei. [**Antagonism between *Babesia caballi* and *B. equi* and the virus of equine infectious anaemia.**—*Veterinariya, Moscow.* No. 8-9. p. 13. 1077

G. criticizes the statement of Prof. Kazanski that there is an antagonism between *Babesia caballi* and *Nuttallia equi*, and between these organisms and equine infectious anaemia. It is claimed that in S. Russia mixed infections of *B. caballi* and *N. equi* are commonly encountered, and the prophylactic use of trypanblue does not

stimulate the *N. equi* infection as has been claimed in the North. It is suggested that the seasonal prevalence of the piroplasms in the North, *B. caballi* in the spring and *N. equi* in the summer and autumn, is due purely to climatic influences acting on the carrier ticks.

No material evidence has been presented of an antagonism between these organisms and the virus of infectious anaemia. It would be unfortunate if it came to be assumed that the presence of piroplasms ruled out the possibility of infection with E.I.A.—U. F. RICHARDSON.

CARNE, H. R., WICKHAM, N., WHITTEN, W. K., & LOCKLEY, R. P. (1946.) **Infection of man by the virus of contagious pustular dermatitis of sheep.** [Correspondence.]—*Aust. J. Sci.* 9. 73-74. 1078

A description of the disease in sheep is given and three cases are recorded in people who had handled infected sheep. The importance of the human infection as an industrial hazard to shearers is discussed. Lesions in the human cases occurred on the skin of the hands at the site of minor injuries from three to six days after exposure to infection. Spontaneous regression occurred with final disappearance of the lesions in three to four weeks. They began as reddish, circular papules, increasing gradually in size and becoming sensitive to touch and in some cases accompanied by throbbing pain. On incision the lesions appeared to be mainly granulomatous tissue with some central softening and accumulation of serous fluid in the late stages. Axillary lymphadenitis occurred in two cases and a general systemic reaction in two cases. Reciprocal cross-immunity tests indicated that the ovine virus was present although the possibility that the virus was a contaminant of a primary staphylococcal lesion was not overlooked. *Staphylococcus aureus* was present in all the lesions but the unusual characteristic lesions and the history indicated that the lesions were due to the virus.—D. C. BLOOD.

— (1946.) **Diseases of dogs following distemper.** Discussion by the Central Veterinary Society. [Speakers: DALLING, T., — BATEMAN, J. K.]—*Vet. Rec.* 58. 375-378. Discussion pp. 378-381. 1079

Prof. Dalling expressed the view that the virus of distemper by itself produces a relatively mild disease. The grave clinical importance of the disease, apart perhaps from nervous sequelae is due to secondary bacterial invaders. Infections of the respiratory tract, alimentary tract, eyes and skin arising subsequent to the virus infection are mentioned. The relation of canine encephalitis and distemper virus is discussed. Bateman assert-

ed that: "The simple febrile state of true uncomplicated distemper is seldom seen and recognised in the field". The clinical features of nervous involvement, respiratory disease, alimentary complaints, diseases of the eyes and skin, heart affections and nephritis are discussed. J. T. Edwards and G. H. Wooldridge were concerned mainly with the relationship of *Brucella bronchiseptica* to nervous disease. Hare recognized β haemolytic streptococcal infection as an entity distinct from distemper virus infection. Many members contributed experiences of methods of immunization.—R. SCARISBRICK.

HORSFALL, F. L., Jr., & McCARTY, M. (1947.)

The modifying effects of certain substances of bacterial origin on the course of infection with pneumonia virus of mice (PVM).—*J. exp. Med.* 85. 623-646. [Authors' summary copied verbatim.] 1080

Evidence is presented which indicates that certain polysaccharide preparations derived from various bacterial species, as well as similar materials not of bacterial origin, are capable of lessening the severity of infection with pneumonia virus of mice (PVM) and inhibiting multiplication of the virus in mouse lungs infected with this agent. It seems probable that modification with respect to the virus is mediated by a substance which may be polysaccharide in nature.

FODDEN, J. H., & RHODES, A. J. (1947.) **Viral infections of the chick embryo respiratory tract. —*Edinb. med. J.* 54. 151-157.** 1081

A description is given of the histological appearance and development of the structures of the normal chick embryo respiratory tract. Inoculation of sterile broth or saline into the amniotic or allantoic cavity of 9-17 day old embryos did not affect the development or microscopical appearance of the normal lung. Neither did a reduction of incubator temperature from 38-39°C. to 36°C. affect development or histological appearance.—F. D. ASPLIN.

BARBER, C. W. (1947.) **Studies on the avian leucosis complex. I. The effects of rearing environment on the incidence of leucosis among white leghorn chickens.—*Cornell Vet.* 37. 349-367.** 1082

Chickens reared at a poultry experiment station under unsatisfactory environmental conditions have regularly shown a high incidence of leucosis. Such chicks were exposed during their rearing period to marked variations in temperature, often overcrowded, cleaning was neglected, exposure to sunlight was denied and there was direct or indirect contact with older chickens.

With improved sanitary conditions, better ventilation, uniform brooding temperature, less

crowding and exposure to sunlight a significant decrease in the incidence of leucosis resulted.

An effort was made to determine the influence of individual factors.

Chickens exposed to decomposing chicken excreta for nearly four months did not show an increased incidence of leucosis.

The incidence in chickens reared until four months old in close contact with pullets or hens did not significantly differ from that of chickens reared in isolation. Neither did brooding at high or low average temperatures for three and a half months or exposure to ultraviolet radiation for four months significantly affect the incidence of leucosis.—F. D. ASPLIN.

POLLOCK, M. R. (1945.) **Pre-icteric stage of infective hepatitis. Value of biochemical findings in diagnosis.—*Lancet.* 249. 626-630.** 1083

Biochemical investigations carried out in 53 cases of infective hepatitis before the appearance of jaundice included serum bilirubin and quantitative direct van den Bergh estimations, tests for urine bilirubin and urobilin and the bromsulphalein-excretion test. The results of these tests in other diseases have also been recorded and discussed with special reference to malaria and glandular fever.

The pre-icteric stage was characterized by abnormal retention of bromsulphalein, excretion of small quantities of bilirubin in the urine and the development of an abnormal direct van den Bergh reaction. Serum bilirubin and urine urobilin did not usually rise above normal limits until shortly before jaundice appeared.

The existence of subicteric cases with little or no rise in serum bilirubin was confirmed.

The results indicate that the bromsulphalein-excretion test and Hunter's test for bilirubinuria can assist in detecting liver damage before the appearance of jaundice and in establishing an early diagnosis.—R. ALLCROFT.

BELLER, K. (1944.) **Ueber Filtration und filtrierbare Krankheitserreger. [Filtration and filtrable agents of disease].—*Arch. wiss. prakt. Tierheilk.* 79. 197-210.** 1084

The nature and classification of the viruses are discussed along with the pleuropneumonia group of organisms, the bacteriophages and the Rickettsiae. Present methods of classification are unsatisfactory but improvement must await further development in our knowledge.—C. A.

CRAIGIE, J. (1946.) **The significance and applications of bacteriophage in bacteriological and virus research.—*Bact. Rev.* 10. 73-88.** 1085

C. discussed the manner in which bacteriophages can be used in bacteriological and virus

research. Chapters deal respectively with the bacteriophage particle, phage antigen and antibody, the bacterial receptors of bacteriophage, the sequelae of phage adsorption, the interference, See also *absts.* 1180 (foot and mouth disease); 1207 (rinderpest).

IMMUNITY

HAWN, C. VAN L., & JANEWAY, C. A. (1947.) **Histological and serological sequences in experimental hypersensitivity.**—*J. exp. Med.* 85. 571–590. [Authors' summary and conclusions copied *verbatim*.] 1086

Groups of normal rabbits were given single intravenous injections of foreign proteins in doses of 1 gm. per kilo, bled at regular intervals for serologic studies, and sacrificed after varying lengths of time for pathological studies. The protein solutions used were of crystallized bovine serum albumin, bovine serum gamma globulin, and bovine serum. The experiments were planned, first, to correlate the sequence of pathological and immunological changes, and second, to compare the responses to two chemically and immunologically distinct plasma protein fractions and to the whole serum of the same species.

The principal pathological lesions in rabbits given bovine serum were similar to those which have been previously observed following the injection of horse serum and were characterized by widely dispersed but segmental acute inflammatory lesions of the arteries. These lesions were at their height 2 weeks after injection and showed marked repair at 4 weeks.

Crystallized bovine serum albumin produced lesions almost exclusively confined to the arteries which were at their height at 2 weeks, were healing at 3, and healed by 4 weeks. The lesions were less numerous and less intense than in animals given whole serum and were only found in some of the animals.

Bovine serum gamma globulin elicited quite different histologic sequences. The most striking lesions involved the glomeruli of the kidneys, and to a lesser degree, the heart. Lesions in the liver and joints were present but less conspicuous, and arterial lesions were rare and slight in degree. The lesions not only differed from those in rabbits given albumin in distribution but in timing, since they were most widespread and acute at 1 week and were healing at 2 weeks after injection. Moreover, lesions were observed in almost every animal.

Results of immunological studies were consistent with the interpretation that the pathological lesions were due to an antigen-antibody reaction in the tissues, as shown by the following:

Acute lesions were only observed when

effect, bacteriophage as an agent for the classification and typing of bacteria, phage mutations, biological studies with phage and latent phages in *Salmonella typhi*.—E. KLIENEGER-NOBEL.

antigen was present and before antibody appeared in the circulation. Healing of lesions was only observed (with one exception) when antigen had almost or completely disappeared from the circulation, usually with the appearance of antibody. There was a correlation between the rapidity of evolution of the lesions and the rapidity with which the antigen disappeared from circulation. There was a rough correlation between the proportion of animals showing lesions and the proportion developing antibodies after the injection of a particular protein solution.

BISSET, K. A. (1947.) **Bacterial infection and immunity in lower vertebrates and invertebrates.**—*J. Hyg., Camb.* 45. 128–135. [Author's summary copied *verbatim*.] 1087

A review is given of some of the literature concerned with bacterial infections and immunity in invertebrates and cold-blooded vertebrates. Among the former, insects have been most fully studied, although a certain amount is known of the immunological reactions of marine invertebrates. Diseases of insects are mainly generalized, bacteraemic conditions, and the great majority are caused by Gram-negative cocco-bacilli. Diseases of cold-blooded vertebrates also are usually generalized, but bacteria from a very wide variety of groups have been isolated from them.

It is probable that this resemblance in the infections of these widely separated groups of animals is due to the fact that, unlike mammals and birds, with whose reactions we are more familiar, the regulation of their temperature and the constitution of their body fluids is not exact. Their toleration of wide variations of their own physical and chemical constitution must reduce their sensitivity to the changes produced by infection, and hence decrease the likelihood of a local reaction, designed to confine the invading organism to the immediate region of its point of entry, i.e. a local inflammation.

The production of humoral antibodies appears to be almost universal in the animal kingdom, although greatly affected by changes in temperature.

The effect of temperature upon the balance between host and parasite is also discussed. This question bears upon the problem of occasional pathogenesis by saprophytes. Even among mammalian pathogens the borderline between

parasite and saprophyte is an indistinct one, especially in such cases as *Proteus* and *Pseudomonas pyocyanea*, and even those species which are usually regarded as exclusively parasitic may readily be constrained to adopt a saprophytic existence on artificial culture. Where cold-blooded animals are concerned the boundary is even more difficult to draw, and it is possible that under suitable conditions, bacteria which are normally saprophytes may be capable of causing infection. This point will be impossible of proof until more sensitive means of definition of bacterial species are discovered.

See also absts. 1041 (antigenic lipid in TB.); 1042 (antigenicity of ester of oleic acid); 1044 (intradermal reactions); 1046, 1047, 1049 (*Corynebact. pyogenes*); 1056 (c.f.t. in brucellosis); 1057 (brucella agglutinins); 1058, 1059 (clostridium toxins); 1063 (*Cl. oedematis* antitoxin); 1073 (coccidiosis); 1152 (chemotherapy and immunity); 1212, 1213 (blood groups in horses).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

SERDYUKOVA, G. V. [Instances of the local mass increase of the tick *Hyalomma anatolicum anatolicum* Koch in Tadzhikistan and its causes.]—*Izv. tadzhik. Fil. Akad. Nauk SSSR*. No. 6. pp. 60–63. [In Russian.] Abs. in *Rev. appl. Ent.* Ser. B. 35. 73–74. (1947.) [Copied verbatim.] 1089

Observations in yards in which cattle are kept in the Hissar Valley (semi-desert zone of Tadzhikistan) showed that the adults of *Hyalomma anatolicum*, Koch, which is a three-host tick and usually infests cattle, occurred with equal frequency on animals of all ages, whereas most of the larvae and nymphs were found on calves. The ticks fed only during the warm period of the year. During July–August, the females began to oviposit 7–9 days after having dropped from the host, the oviposition period lasted 15–19 days, and the eggs hatched in 23–26 days. Larvae fed for 2–4 days and moulted after a further 6–12 days, and nymphs fed for 4½–6 days and moulted after a further 12–20 days. In winter, unfed males and fed and unfed females entered a diapause, and unfed larvae were able to survive in unheated quarters. The ticks detached themselves from their hosts at night, most of the larvae and nymphs doing so between 9 and 11 p.m. Some of a number of larvae and nymphs that were placed on a calf in the morning became fully engorged during the day, but they remained on the calf until darkness set in. This behaviour is probably an adaptation to local climatic conditions, since it protects the ticks from exposure to the direct rays of the sun, which are fatal to them. They are apparently inactive during the hot part of the day, and attach themselves to their host at night, as has been recorded for other species of *Hyalomma* under desert conditions. In observations on an isolated plot, only slightly over 5 per cent. of a

FISCHEL, E. E., & KABAT, E. A. (1947.) A quantitative study of the Arthus phenomenon induced passively in the rabbit.—*J. Immunol.* 55. 337–343. 1088

The authors record some quantitative experiments on the direct and reverse Arthus phenomenon induced passively in rabbits. The antigen antibody system employed for the experiments was four times recrystallized hen egg albumin and anti-egg albumin rabbit serum. The amounts of antigen and antibody required to elicit a standard reaction, according to the various routes of inoculation, were used and were estimated in terms of protein nitrogen.—R. COOMBS.

counted number of unfed examples of *H. anatolicum* attached themselves to calves between 12.30 and 5.30 p.m.

Infestation of village cattle was found to be severe. These animals were driven out to graze in pastures during the day, but were kept at night in open yards surrounded by loess walls. The yards contained enclosures for the calves, and other fittings made of wood, and ticks in various stages, both engorged and unfed, were found in cracks in and beneath these and in other sheltered sites associated with them. No ticks occurred under cakes of dung plastered on the loess walls. These conditions were apparently favourable to the development of the ticks and maintained the infestation. When almost all the permanent wooden structures in one of the yards were removed in the autumn, the soil consolidated and a portable enclosure for calves erected in a different place in the following year, only about 50 engorged nymphs could be collected each morning in the enclosure during July and August, as compared with up to 1,000 in the preceding year. It is therefore recommended that wooden structures in the yards should be portable, and that they should be cleaned and moved to different places and the soil on the old sites dug over once a month from the time ticks appear on the cattle in spring.

LOTOTZKIĬ, B. V., & POKROVSKIĬ, S. A. (1946.) [An experiment in the organisation of a minimum complex of measures against haemosporeidiasis in northern Tadzhikistan.]—*Izv. tadzhik. Fil. Akad. Nauk SSSR*. No. 6. pp. 64–74. [In Russian.] Abs. in *Rev. appl. Ent.* Ser. B. 35. 74–75. (1947.) [Copied verbatim.] 1090

Investigations on the control of ticks that transmit various forms of piroplasmosis of cattle in Tadzhikistan, where these diseases cause high

mortality among newly introduced animals, were carried out in a village near Ferghana from December 1939 to August 1941. The cattle in another village, where conditions were similar, served as controls. The ticks concerned were *Hyalomma detritum*, Schulze, and *H. anatolicum*, Koch, which transmit *Theileria*, and *Boophilus calcaratus*, Bir., which transmits *Piroplasma*.

Observations on the behaviour of the ticks showed that larvae or nymphs of *H. detritum* occur on the cattle between September and mid-April. The authors distinguish four periods of infestation, however, in September-October, November-December, December-January and February-April. The larvae moult on their hosts, and nymphs that dropped in any of these periods did not moult to the adult stage until mid-May. Infestation by adults began in April, reached a peak towards the end of May or the beginning of June, and ceased towards the end of September. *H. anatolicum*, which the authors consider to be a two-host tick, infested cattle from February to the end of November. Larvae and nymphs were present in July, August and September and, like the adults, were most numerous in the first ten days of August. *B. calcaratus* occurred on cattle from mid-February to the end of November and there were three waves of infestation, of which the first lasted from mid-April till about June, the second began in July and reached its peak in August, and the third overlapped the second and lasted till mid-October. Larvae, nymphs and adults usually occurred simultaneously.

In an attempt to control *H. detritum*, the animals were wiped down with a mixture of equal parts of kerosene and crude cottonseed oil four times during the winter of 1939-40, the dates selected being 31st December, 25th January, 23rd February and 13th March, and with 0.2 per cent. solution of sodium arsenite at weekly intervals during the summer, but the examination of the cattle in the summer showed no appreciable reduction in infestation as compared with the controls. This was attributed to faulty timing of the winter treatments. Cottonseed oil was not available during the following winter, and the animals were treated twice, on 15th and 25th January with "desinsectalin" after which applica-

tions of sodium arsenite were made every six days, beginning on 5th February. The results were still unsatisfactory, and it was concluded that the materials used were not effective.

In the experiments against *B. calcaratus*, the cattle were treated with a 0.18-0.2 per cent. solution of sodium arsenite at intervals of six days from 6th April to 11th October 1940 and again from 5th February to 1st August 1941. The liquid was brushed over the upper parts of the body and sprayed over the lower parts. The results were satisfactory, the numbers of this tick taken per animal averaging 19.2 in June-November 1940, as compared with 647.7 in the controls, and 89.8, including an average of 20.8 larvae and nymphs, between 1st January and 1st August 1941, as compared with 426.6, with 194.1 larvae and nymphs, for the same period in the preceding year. This treatment also proved effective against *H. anatolicum* and reduced the average number of this tick per animal to 34.4, including 11.7 larvae and nymphs, as compared with 166.9, with 77.8 larvae and nymphs, in the controls, between April and November 1940, and the average number of larvae and nymphs to 0.7, as compared with 73.8 in the controls, from 1st January to 1st August 1941. These reductions in infestation were partly due to removal of the engorged ticks every few days, cleaning of the cattle yards and the transfer of the animals to uninfested winter quarters.

BOCCIA, M. (1942.) Sulle dermatosi parassitarie del *Mus musculus albus* (da *Myocoptes musculus* e da *Myobia musculi*). [Parasitic mange in the white mouse (*Mus musculus albus*). Causal agents *Myocoptes musculus* and *Myobia musculi*.]—*G. Batt. Immun.* 29. 678-685. [German, French & English summaries. Abst. from English summary.] 1091

A study is described of mange in three different colonies of white mice, caused by *Myocoptes musculus*, by *Myobia musculi* and by a combination of the two acarids. B.'s results confirm the findings of the small number of earlier workers who consider these parasites to be pathogenic in their effect on white mice, and are opposed to the views of the greater number that the parasites are merely harboured without causing damage to the skin.—K. J. SINCLAIR.

See also absts. 1181 (ticks on pastures); 1182 (ticks); 1184 (mosquito repellents); 1185, 1186 (D.D.T.); 1200 (aeroplanes and D.D.T. for control of mosquitoes); 1201 (aerosols as insecticides).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

LI, P (1946) A histopathological study of small lungworm infection in sheep and goats with special reference to muscular hypertrophy of the lung.—*J. Path. Bact.* 58. 373-379. 1092

The eggs of *Protostrongylus* cause raised, greyish nodules, 1-2 cm. in diameter in the

pulmonary parenchyma, beneath the pleura and usually in the dorsal border of the posterior lobes of the lungs. Generally there is a macrophage reaction around both eggs and larvae, and foreign body giant cells and even pseudotubercles are found. Precipitated fibrin is

occasionally seen on the surface of the eggs and larvae. Cellular reaction may be absent in the lamb presumably because of its age and immunological state. In infected lungs lymphoid cells increase greatly in number; eosinophilic response is generally absent. With secondary bacterial invasion the cellular reaction is that of ordinary broncho-pneumonia. A marked feature is pronounced muscular hypertrophy involving the normally occurring fine muscle fibres along the bronchioles and ductules and is the result of obstruction in the bronchiolar system. When obstruction is slowly produced and incomplete there is usually hypertrophy of the musculature of the terminal bronchioles and ductules, whereas rapid and complete obstruction leads to collapse without hypertrophy. When complete obstruction is superadded to incomplete, the resulting lesion is a combination of hypertrophy and collapse or "muscular cirrhosis" of the lung. The cause of the muscular hypertrophy may be due to some pathological stimulus or to the influence of the wriggling movements of the parasites and their larvae. Compensatory emphysema is usually associated with consolidation and collapse of the lung parenchyma.—J. N. OLDHAM.

KRASTIN, N. I. (1944.) K epizootologii diktio-kaulëza krupnogo rogatogo skota. [Epidemiology of lungworm (*Dictyocaulus*) infestation in cattle.]—*Veterinariya, Moscow*. No. 8-9. pp. 14-17. 1093

Working in the central areas of Russia a study was made of the seasonal infestation of cattle with *Dictyocaulus* by P.M. inspection, and also by examination of the faeces for larvae by the use of Baermann's apparatus. Larvae were rarely found in December, January and February, but the results of autopsy did not confirm this finding. In the course of 1943, 1,210 lungs of cattle of various ages were examined, and there was an infection rate in March-April-May of about 30%, a fall in June and July to 10-12%, followed by a sharp rise in September to 58%, and then a gradual decline to about 35% in December. Why examination for larvae failed to reveal this winter persistence was not determined. Thus under the conditions in central Russia, the majority of infected cattle do not reveal infestation on examination for larvae during January, February, March, November and December. On badly infested farms P.M. examination of calves revealed no, or only a few, worms in calves during the spring and autumn months.

It is concluded that in the spring young animals become infected with *Dictyocaulus* from the adult animals which are carriers, but which themselves can suffer from the infestation in a severe form.

Under conditions in central Russia it is recommended that mass diagnostic inspection of cattle for *Dictyocaulus* should take place not later than September, and not earlier than April. For inspection during the period October to March faeces should be exposed in the Baermann apparatus for 7-8 hours. The basis of control measures on a farm should probably be the complete prevention of contact between young animals and adults on pasture, tracks and watering places.

—U. F. RICHARDSON.

I. SPRENT, J. F. A. (1946.) Studies on the life-history of *Bunostomum phlebotomum* (Railliet, 1900), a hookworm parasite of cattle.—*Parasitology*. 37. 192-201. 1094

II. SPRENT, J. F. A. (1946.) Some observations on the bionomics of *Bunostomum phlebotomum*, a hookworm of cattle.—*Parasitology*. 37. 202-210. 1095

S. has increased the knowledge of the life history of *Bunostomum phlebotomum* which was found in 55% of 250 yearlings slaughtered in Nigeria. The parasite was not seen in calves below five months of age and occurred in small numbers in old cattle, the most susceptible age being 6-18 months. The predilection site was the pyloric end of the duodenum where over 2,000 worms were sometimes found. Descriptions are given of the processes of copulation, egg formation, spermatogenesis, cleavage, embryogeny and hatching and of the first, second and third stage larvae. Under laboratory conditions the third larval stage was reached in 113 hours. By histological examination, penetration of the skin of calves by infective larvae was confirmed, the larvae having reached the dermis within 30 min. and entered the cutaneous blood vessels within 60 min. after skin application. Larvae were found in the lungs ten days after skin penetration. Growth of the third stage larva in the lungs and the morphology of the fourth stage larva are described. The fourth stage larvae exsheathed in the lungs and migrated to the intestine where growth and sexual differentiation occurred and, after the fourth moult, adults emerged. The smallest adult recovered was just over 5 mm. long and had a definitive buccal capsule with a dorsal cone, two ventral lancets and a pair of lateral lancets which apparently move into a ventral position as the hookworm reaches maturity, which was found to be between 30 and 56 days after skin infection.

II. S. considers that *Bunostomum phlebotomum* is partly responsible for a number of deaths amongst yearling cattle in Northern Nigeria. The environmental conditions affecting the preparasitic stages of this nematode are described in an attempt to explain the seasonal incidence of hookworm disease and to suggest methods of control. Infec-

tive larvae are positively thermotropic and phototropic but not negatively geotropic and do not climb grass, they remain in the dung and enter the host by adherence of the faeces to the skin. Lack of air, immersion in water, temperatures below 10°C. and lack of moisture inhibit development. Infective larvae are resistant to five days' direct exposure at a relative humidity of 75 at 25°C.; in dry faeces they are resistant to 14 days' exposure. In Northern Nigeria, drying is the most inhibitory factor; the extreme dryness of pastures in the dry season prevents faeces from clinging to the skin. Penetration of the skin takes place in the rainy season only. The female worm may lay 600 eggs in 12 hours but the rate varies throughout the year. The hookworm burden of nomadic cattle is greater in the dry than in the rainy months, reaching a maximum in February. Adequate treatment in December, in Nigeria, should suffice to keep the animals healthy during the following dry season.—J. N. OLDHAM.

See also abst. 1187 (anthelmintics).

CHRISTENSEN, N. O., & ROTH, H. (1946.) Undersøgelser over mave-tarmparasitter hos katten. [Investigations in gastrointestinal parasites of cats.]—K. VetHøjsk. Aarsskr. 1946. pp. 114-144. [English summary.] 1096

This is a report of an examination of 130 Copenhagen cats for gastro-intestinal parasites. The following were found:—*Ollulanus tricuspis* in the stomach of 13 cats, *Capillaria putorii* in the stomach of one cat, *Ancylostoma caninum* in the small intestine of two cats, *Toxocara cati* in the stomach and intestine of 67 cats, *Taenia taeniformis* in the small intestine in seven, *Cryptocotyle lingua* in the small intestine of six, and *C. concava* in one, *Isoospora rivolta* in four and *I. felis* in seven faecal samples.

Some of these parasites constitute first observations for cats in Denmark and *C. lingua* is a new species. There are numerous figures and photographs.—J. E.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

MURRAY, W. S., & WARNER, S. G. (1947.) Segregation mammary cancer to no mammary cancer in the Marsh albino strain of mice.—J. nat. Cancer Inst. 7. 183-188. 1097

The authors report the separation of a non-cancer strain of mice from a line of mice with a high tumour incidence. The separation occurred in a breeding pen of four females and one male (brother × sisters). At the time of this report there had been no mammary tumours observed in 15 generations (351 breeding females) of the descendants of one of these females. The progeny of the three sisters had the average incidence of mammary tumours for this strain.

The authors suggest several explanations for this phenomenon.—A. R. JENNINGS.

LÜBKE, A. (1944.) Zur Pathologie der Rinderleukose. Ihre Stellung als Geschwulstkrankheit des retikuloendothelialen Gewebes. [The pathology of bovine leucosis. Its establishment as a neoplastic disease of the reticulo-endothelial tissue.]—Virchows Arch. 312. 190-229. 1098

A detailed description of 57 cases of bovine leucosis, all cows, with a discussion on its nature. Three quarters of them were between four and eight years of age.

Histologically four main, with two subsidiary, cells types in the diseased tissue could be differentiated:—monomorphic, medium sized, fibrillary; monomorphic, large sized, fibrillary; monomorphic, large sized, mainly afibrillary; polymorphic, fibrillary; polymorphic, mainly afibrillary; and mixed forms. The appearance of these cell types is illustrated and their nature is discussed. The clinical material extended over the different cell types respectively as follows:—24 cases; 14 cases; one case; nine cases; two cases; seven cases. Blood picture data from eight cases is given in a table: the picture was leucaemic in five and aleucaemic in three.

The internal organs most commonly affected with leucosis were the abomasum (in 90% of cases), heart (76%), kidneys (53%), spleen (48%), uterus (45%), liver (38%), intestine (31%), and lungs (21%). Elsewhere macroscopic changes were not noticeable. The lesions in these organs are described in detail.

In consideration of the findings, it is concluded that bovine leucosis is a neoplastic process of the reticulo-endothelium, corresponding pathologically to human reticulosarcomatosis.—J. E.

NUTRITIONAL AND METABOLIC DISORDERS

STAPLEDON, R. G. (1946.) The palatability and nutritive value of herbage plants.—J. Minist. Agric. 53. 428-431. 1099

Numerous factors influence both palatability and nutritive value of plants. The study of these factors is extremely difficult and with regard to

palatability needs an understanding of the reactions of the grazing animal which is still limited and elementary. Palatability is more important than nutritive value, for unless a plant is consumed in fair quantities its nutritive value is of little significance. Intrinsic palatability of plants is more important for the farmer than the relative palatability of particular plants when the scope for selection is comparatively wide. The study of the intrinsic palatability of the chief species and strains of herbage plants would be valuable, but the control of the grazing animals was found to be difficult. A continuous 24-hourly watch is necessary as shown in experiments on the lands under the Cahn Hill Improvement Scheme. During daytime, particularly on fine dry days, all the sheep grazed on the improved (succulent herbage) patches. At dawn, however, the sheep preferred to take their first feed on the rough natural (unimproved) grazing, and similarly during wet periods they preferred the latter grass. The criterion for the palatability of plants is the proportion of the amount eaten to that existing. New Zealand perennial rye-grass seemed to be less eaten, but when the ratio was calculated no difference from other plants was found. Animals will usually start and remain on plots where rapid and early growth occurs and herbage which start growth later will tend to be neglected and grow to maturity. The bred leafy and late strains of the grasses were therefore found in plot trials to be less grazed than the quicker growing ordinary commercial hay strains and were considered as less palatable. Another factor affecting the result of palatability tests in field trials is accessibility. The commercial hay strains grow much more erect than the pasture strains and are therefore more accessible to the animal. Early hay strains are more properly grazed than the prostrate pasture strains, but fields with the latter strains mixed with white clover proved to be equal to plots with the early hay strains. The fundamental criterion however is the health and productive capacity of the animals and further research is necessary to test the value of herbage plants.

The nutritive value of plants depends on the type and age of plants. Short and leafy grass is more highly concentrated than longer grass. Fortnightly cuts tend to give nutritionally superior herbage than monthly cuts. Clovers, weight per weight, are richer in calcium and protein than are the grasses. Reduction of the amount of eatables available per acre and their accessibility increased the concentration of nutrients. Further reduction may adversely influence the performance of animals, because it may affect their time spent resting. Sheep spent a longer time resting when grazing ley herbage a month old than when grazing

herbage 14 days old. The live-weight increases per acre were proportionate to the times spent resting. The "rest" factor will especially apply to fields mixed with bulky white clover like S100. The protein content of the mature leaves of S100 does not diminish as quickly as that of the grasses. Herbage grazed at 3-4 week intervals would therefore maintain a rich protein concentration. The nutritive value of different species and strains of grasses is not very different: meadow foxtail and Yorkshire fog, if kept well grazed, are rich in protein, cocksfoot is rich in protein and fibre content, timothy is relatively low in protein, but has a high percentage of dry matter. Of the herbs, ribgrass, daisy and hogweed are particularly rich in lime, phosphate and potash.

Both nutritive value and palatability are greatly influenced by soil conditions. Manuring when balanced and adequate, increases both properties. Sheep preferred areas of the lands of the Cahn Hill Improvement Scheme where heavy dressings of lime, basic slag and nitrogen had been applied. Animals may avoid plots which have received recent nitrogen dressings.—E. KODICEK.

— (1946.) **Recommended nutrient allowances for dairy-cattle.** [Committee on Animal Nutrition, National Research Council, U.S.A.]—*J. Amer. vet. med. Ass.* 108. 172-175. 1100

A table of allowances in terms of digestible protein, total digestible nutrients, calcium, phosphorus, carotene and vitamin D is given for growth, maintenance, pregnancy and lactation. The data available for calculating precise requirements are described as still inadequate, but the estimates are designed to allow a safe margin over minimum needs.

The tables are most convenient for assessing the needs of dairy cattle at all stages of growth and productive life. Starch equivalents are not mentioned. Notes on meeting the allowances by means of particular feedstuffs are very brief.

The most interesting section of the report is that which summarizes recent findings on minerals, trace elements and vitamins—relating them to practical conditions and deficiencies, particularly in the U.S.A.—T. H. FRENCH.

WOOLLEY, D. W., & SPRINCE, H. (1945.) **The nature of some new dietary factors required by guinea pigs.**—*J. biol. Chem.* 157. 447-453. 1101

In highly purified rations, the dietary essential G P F-2 could be replaced by a mixture of cellulose and casein or cellulose, arginine, cystine and glycine. A level of 30% of casein was required for optimal growth, but 40% was harmful. G P F-1 was identified as folic acid, G P F-3, which has not yet been identified, was found to be soluble in alcoholic HCl, but was not

precipitated by lead acetate or adsorbed by norit. It exhibited some of the properties possessed by streptogenin, the new growth factor required by certain bacteria. The survival time of animals deficient in G P F-3 was somewhat prolonged by supplements of biotin and *p*-aminobenzoic acid.

—E. M. CRUICKSHANK.

BLAIR, M., PORTER, M. T., & ATKINSON, L. A. (1945.) **The place of protein in the diet of a pregnant patient.**—*Canad. med. Ass. J.* 53. 434-437. 1102

Protein deficiency may be due to lowered intake, increased need or increased loss of protein. Protein is essential to growth, and growth begins with conception not birth. In 600 cases with a diet rich in protein not one was seen in which it was felt that too much protein had been given. The relation of water balance and oedema to the toxæmias of pregnancy is discussed. The importance of serum protein and its relationship to oedema is emphasized. Hypoproteinaemia is not the complete explanation for oedema.

—R. GWATKIN.

HIMSWORTH, H. P. (1946.) **Protein metabolism in relation to disease.**—*Proc. R. Soc. Med.* 40. 27-34. 1103

The specificity of the different tissue proteins is well established. Alterations in the quantity or quality of dietary protein may influence the amount of the different tissue proteins formed, but not their composition. The requirement for adults is of the order of 1 g. protein per kg. of body weight, while children require 3 g. per kg. The requirements for pregnancy and lactation are intermediate. Though limitation of dietary protein, short of starvation, does not cause cessation of growth or prevent production of a normal foetus, liberal allowances are necessary for optimal nutrition, and for the prevention of illnesses resulting from additional strains such as pregnancy or infections. Certain amino acids are indispensable in the diet, but the requirements for these differ qualitatively and quantitatively at the various stages of development. In the East, protein deficiency occurs in time of famine, but under normal conditions in Western countries, it is secondary to some illness such as anorexia, lesions of the alimentary tract or excessive utilization such as occurs in fevers and metabolic diseases. In starvation plasma albumen falls rapidly, while plasma globulin is little affected. Hypoproteinaemia is characterized by oedema, which occurs when the total plasma protein falls below 5 g. per 100 ml., but only if adequate amounts of water and salt are present. An excessive breakdown of body protein occurs in fevers and after fractures, burns and operations, and it has been found that a high protein intake

facilitates recovery in such instances. There is increasing evidence that the quantity and quality of dietary protein influences the production of haemoglobin and it has been suggested that protein deficiencies may play a part in the anaemias following infection, injury or exposure to poisons such as T.N.T. which combine with amino acids.

E. M. CRUICKSHANK.

WILLETT, E. L., HENKE, L. A., & MARUYAMA, C. (1946.) **The use of urea in rations for dairy cows under Hawaiian conditions.**—*J. Dairy Sci.* 29. 629-637. 1104

Feeding trials of the double change over type as described by COCHRAN *et al.* (1941), were conducted on 26 Holstein-Friesian cows to investigate the usefulness of urea as a substitute for high protein concentrates in rations for lactating cows. The results showed that the dairy cow can utilize nitrogen from urea for milk production but not as efficiently as nitrogen derived entirely from plant sources such as soya bean oil meal. When urea was fed at 2.5% or 1.25% levels in the concentrate mixtures, supplying 36% at 19% respectively of the total crude protein equivalent intake, less milk was obtained than when soya bean oil meal was used as the only high protein supplement.

Since cane molasses made up 25% of the concentrate mixtures, it was thought that such high levels might cause the comparatively low milk production of cows on urea rations, but observations showed that this high level had no detrimental effect on the synthesis of protein from urea and there were even indications that molasses might promote its utilization.—R. ALLCROFT.

BISKIND, G. R., & BISKIND, M. S. (1946.) **The nutritional aspects of certain endocrine disturbances.**—*Amer. J. clin. Path.* 16. 737-745. 1105

The liver is the site of inactivation of oestrogens and androgens. The authors have presented evidence that inactivation of oestrogens, but not of androgens, is dependant on an adequate intake of vitamin B (the actual factors involved have not been identified). In nutritional deficiency the oestrogen level in the body is raised and this leads to various abnormalities, *e.g.*, pre-menstrual tension, mastalgia, impaired involution of the uterus, etc., in the female, and testicular atrophy, gynecomastia, etc., in the male. All the functional conditions respond readily to intensive and complete nutritional therapy, but the organic changes respond more slowly, and often less completely.

—J. M. ROBSON.

SHREWSBURY, C. L., & VESTAL, C. M. (1943.) **The mineral deficiencies of soybeans for hogs and rats.**—*Bull. Ind. agric. Exp. Sta.* No. 489. pp. 19. 1106

A brief review of the work on the mineral deficiencies of soya beans, especially of calcium and phosphorus.

A series of experiments conducted over a period of three years are described.

Batches of eight to ten pigs were used to determine the optimum ratio of calcium to phosphorus in a ration and also the optimum level of each mineral at a fixed ratio (1.5 : 1). Tables are provided showing the composition of the rations used, the ratio range extended from 0.2 : 1 to 2.9 : 1, and the intake level range from 0.05% to 0.75% Ca and 0.26% to 0.5% P. The results of these experiments are tabulated to show the effect of each treatment on growth and bone characteristics. Differences between batches as regards growth were not significant but bone characteristics varied considerably; the optimum Ca/P ratio lay between 1.5 to 2.5 : 1 and the intake at fixed ratio to be 0.55% to 0.68% Ca and 0.4% to 0.45% P. The bone characteristics were deduced from the pig's femoral and tibial bones.

The addition of trace elements to a normal diet of maize and soya bean meal was found to be without effect.

Similar experiments using rats are described and the results tabulated, the optimum Ca/P ratio was 1 to 1.5 : 1 and the intake level to be 0.6% P and 0.4% Ca. A greater range of Ca/P ratio was used for the rats, and when the ratio was greater than 4.2 : 1 there was a significant and progressive reduction in growth.

Rats were used to show the value of different sources of calcium and phosphorus, calcium carbonate and tri-sodium phosphate proved the best.—G. L. BAILEY.

GERRY, R. W., CARRICK, C. W., ROBERTS, R. E., & HAUGE, S. M. (1947.) **Phosphate supplements of different fluorine content as sources of phosphorus for chickens.**—*Poult. Sci.* 26. 323-334. 1107

In a search for a phosphorus supplement for chicks, receiving their main protein requirements in the form of vegetable matter, to replace steamed bone meal, the efficacy of raw rock phosphate, superphosphate, fused rock phosphate, defluorinated rock phosphate, and naturally occurring colloidal phosphate was tested.

The fluorine in rock phosphate was detrimental to body growth and normal bone formation in quite young chicks (up to eight weeks) but less detrimental to older chicks. After 16 weeks a fairly high level of rock phosphate was tolerated. The availability of phosphorus and the deleterious effect of fluorine varied in the different phosphorus supplements used. Fluorine accumulated in the

bones of chicks in proportion to the fluorine level in the diet. A high level of vitamin D in the diet reduced the requirements for phosphorus. The materials such as defluorinated and fused rock phosphate, which were low in fluorine content, were the best substitutes for steamed bone meal.

—R. MARSHALL.

BREIREM, K. (1944.) **Kopper- og koboltmangel hos vare husdyr. [Copper and cobalt deficiency in domestic animals.]—Norsk Landbruk.** 10. 323-235 & 249-251. 1108

In Norway three kinds of mineral deficiency diseases are recognized:—"slikkesyke" of the coastal districts which is a copper deficiency, aphosphorosis, and "tørrsott", of complex causation. "Slikkesyke" occurs along the west coast where the natural fodder plants contain abnormally low copper (3.4 mg. per kg. of dried matter, cf. 7.5 mg. per kg. reckoned as normal). The disease occurs most potently in livestock wholly dependent on grazing on locally harvested fodder and is more or less evident in stock given some imported food, particularly grain or oil cake. The copper content of 15 foodstuffs of these types is quoted; it is very high, ranging from 10-30 mg. per kg. Seaweed is very poor in copper and for this reason is often disadvantageous as a dietary constituent in the coastal districts. Molasses is valuable for prevention of "slikkesyke" as it is rich in copper.

Aphosphorosis occurs in the interior of Norway, in association with dried hay containing less than 0.4% P_2O_5 . Both types of deficiency disease have been investigated and it has been confirmed that they are curable by administration of copper sulphate and secondary sodium phosphate or by both together. Thus 81.6% cures were obtained in 822 animals given copper supplement, 82% of those given copper + phosphorus and 93% of 80 animals given phosphorus. The animals in question appear to have been exclusively sheep.

Further experiments were made with copper and cobalt, separately and together and it was found that there was a serious cobalt deficiency in many places in the counties of Nordland, Møre, Rogaland, Hordaland and West and East Agder. In one locality Ålesund in Møre cobalt deficiency was so severe that it was impossible to rear calves. The cause was unknown until the diet was supplemented by cobalt as an experiment. The result was spectacular and enabled a firm diagnosis to be made for the first time in Norway. In some places there was a deficiency of both cobalt and copper and it is convenient to treat both forms by a mineral mixture containing 1% copper sulphate

and 0.1% cobalt nitrate or sulphate. Milch cows should receive 75–100 g. of the mixture daily and sheep 15 g., in order to ingest sufficient Cu and Co in severely deficient places. Other ways of dealing with these animal deficiencies are the application of the above salts to pasture land as fertilizers and the obtaining of fodder naturally sufficient in them, from distant places.—J. E.

PEDERSEN, J. G. A. (1940.) *Experimentel Rakitis hos Svin. Betydningen af Foderets Indhold af Fytin og Fytase. [Experimental rickets in swine. Significance of phytin and phytase content of the food.]—Beretn. Vet.-og Landbohøjsk., Kbh. No. 193. pp. 235. [English summary.]* 1109

This monograph comprises a detailed review of the literature and a report of extensive research into experimental rickets in swine. Numerous experimental diets were used, all being adequate in every necessary food factor except for one or more of the following factors which were regarded as significant for the genesis of rickets, calcium, phosphorus, phytin, phytase and vitamin D. The experimental pigs were examined very thoroughly after various periods on the test diets and much of the report consists of the protocols.

The main advance in knowledge that was made was the recognition of the importance of phytin as a rachitogenic substance and of the protective action of phytase. Phytin is inositol hexaphosphate and is an organic phosphorus compound present in cereals, especially maize and phytase is a phytin-splitting enzyme present in rye, wheat and barley but not in maize, oats or oil cakes. Under the action of phytase, phytin gives up its phosphorus in soluble and absorbable form and this factor is anti-rachitic in function.

Rickets could be produced in pigs by any of these diets:—(1) a P-deficient diet containing 50% tapioca and 37.5% white flour; (2) the same diet containing also 2.5 g. of phytin per kg. of dry matter; (3) a ration containing 50% of oat meal; (4) a ration containing 70% of maize; (5) a ration containing 30% wheat bran, 30% wheat and 32.5% barley, scalded before feeding, so that the phytase was destroyed. The following rations were incapable of causing rickets:—the above rations (3) and (4) supplemented by inorganic P (6–7 g. per kg. dry matter); rations (2) or (4) in which the phytin was split before feeding; ration (2) to which was added wheat bran (containing phytase); ration (5) unscalded.

The addition of vitamin D to rachitogenic diets was sometimes beneficial, but not always. Unless the phytin is split in the intestine it cannot be absorbed, but other forms of P are readily absorbed. Calcium can combine with phytin P

and the complex is unabsorbable, so phytin inhibits the absorption of both its own P and Ca with which it may combine. Phytase releases P from phytin and so favours absorption, as it is subnormal in rickets. The degree of rickets and the growth rate are associated with a Ca × P figure in the blood and with the Ca and P contents of the bone ash.

The theories of Bruce and Callow (1934) and of Mellanby (1921) are both correct, the former in connexion with a Ca-rich, and the latter with a Ca-poor, diet, and the phytase content of a cereal is the important factor determining its rachitogenic action, over and above the Ca and P content of the diet.—J. E.

MELLANBY, E. (1947.) *Vitamin A and bone growth: the reversibility of vitamin A-deficiency changes.*—*J. Physiol.* 105. 382–399. 1110

Vitamin A controls the shape and structure of growing bone by its influence on the position and activity of osteoclasts and osteoblasts. When a vitamin A deficient animal is fed vitamin A, the osteoblastic and osteoclastic activity returns to regions where it is normally found. The activity tends to restore the normal shape of the dysplastic bone formed during deficiency. The general thickening and dysplasia of bone in vitamin A deficiency may be produced in different ways as shown in a study of three regions, the basi-occipital, the periosteal bone covering the labyrinth and the sphenoid bone in relation to the optic foramen. The mode of recovery on treatment with vitamin A was different in each case. If near to parts of the nervous system, the changed shape of bones may destroy the nervous tissue, but the recovery of the dysplastic bone on the addition of vitamin A was not dependent on the condition of the adjacent nervous tissue.—E. KODICEK.

MOORE, L. A. (1946.) *Vitamin A, ascorbic acid and spinal fluid pressure relationships in the young bovine.*—*J. Nutrit.* 31. 229–236. 1111

Calves subjected to severe deficiency of vitamin A showed an increase in spinal fluid pressure, accompanied by a decrease in the ascorbic acid content of plasma and spinal fluid. When chlorobutanol was given by mouth or ascorbic acid was injected subcutaneously, the ascorbic acid content of the plasma and the spinal fluid were maintained at normal levels, but the spinal fluid pressure increased as the vitamin A deficiency progressed. It is concluded, therefore, that in vitamin A deficient calves, the increased spinal fluid pressure is not attributable to a disturbance in the synthesis of ascorbic acid.—E. M. C.

TEMPERTON, H., & DUDLEY, F. J. (1946.) **The effects of progressive vitamin-A depletion in adult fowls as indicated by economic characteristics, liver storage and clinical symptoms of avitaminosis.**—*Harper Adams Util. Poult. J.* 31. 61-77. 1112

The authors studied the progress and rate of depletion of vitamin A reserves in adult birds and their young when fed a diet deficient in carotene and vitamin A. The survival and growth of the young birds were noted, the fertility and hatchability of eggs and egg production were taken into account and observations were made on the appearance of clinical symptoms of vitamin A deficiency. The vitamin A content of livers of breeding birds fed a vitamin A free diet was determined at the stages when the health of their progeny was adversely affected, when the hatchability of their eggs declined when the egg yield was reduced or arrested, and when symptoms of a vitamin A deficiency were apparent in the breeders themselves.

Under field conditions the initial indications of sub-optimal vitamin A reserves in adult birds were a collective decline in the viability of the progeny, yield and hatchability of eggs. No change was observed in the fertility of the birds. The falling off in hatchability was caused by embryonic deaths, mainly towards the end of the incubation period. Male chicks were not less resistant to the vitamin A deficiency than female birds. The clinical syndrome of advanced deficiency involving ocular, mouth and throat lesions appeared in all birds either at the time of the decline in economic characteristics or soon afterwards. There was no marked decrease of liver reserves of vitamin A during the experiment but there was a wide variation due to genetical dissimilarities. Birds with clinical symptoms had almost no vitamin A in their livers, in advanced stages of vitamin A deficiency only. If carotene was added to the basal rearing diet to provide 1,450 I.U. of vitamin A per lb. of total food, the growth was restored and mortality reduced.

—E. KODICEK.

PEIRCE, A. W. (1945.) **The effect of intake of carotene on the general health and on the concentration of carotene and of vitamin A in the blood and liver of sheep.**—*Aust. J. exp. Biol. med. Sci.* 23. 295-303. 1113

Sixteen wethers and two ewes, aged 4-8 months, which had been grazing on pasture, and had been weaned approximately two months previously, were selected at a period when pastures had been dry. After initial determinations of plasma vitamin A, three wethers were slaughtered and liver vitamin A concentrations estimated.

The remaining sheep were placed on a diet, the mean daily intake of carotene from which was approximately 40 γ per kg. live weight. The gradual replacement of chaffed wheaten hay by chaffed wheaten straw reduced the mean daily carotene intake by the end of nine weeks to about 20 γ per kg. For the remainder of the experiment the carotene intake of the sheep on the basal diet was about 12 γ per kg. Of those animals surviving at the end of nine months, three were maintained on the basal ration. The remaining six were divided into two groups, one receiving sufficient dehydrated lucerne leaf meal to bring the mean daily intake of carotene to 25-30 γ per kg., the other sufficient to bring the mean daily intake of carotene to 50-55 γ per kg. Sheep had been slaughtered periodically to determine liver concentrations of vitamin A.

The basal diet permitted satisfactory growth in the sheep for periods of upwards of one year. It resulted, however, in night blindness, low levels of vitamin A in the blood and liver and eventually in anorexia, muscular inco-ordination and death. The liver vitamin A concentration fell from an initial level of 200 γ per gm. liver to 100 γ (two months), to 35 γ (four months) and to 4 γ (nine months). The plasma vitamin A concentrations fell proportionately more slowly. The initial level of 35 γ vitamin A per 100 ml. plasma was maintained for three months and fell to 23 γ (six months) to 13 γ (nine months) and to a constant level of 6 γ from the thirteenth month.

The addition of dried lucerne leaves at the end of nine months to supply 25-30 γ carotene per kg. body weight, arrested the fall in the levels of vitamin A in the blood but had little beneficial effect on night blindness and did not augment the remaining reserves of vitamin A in the liver. The group of sheep receiving the 50-55 γ per kg. intake of carotene showed an increase of 100% in the level of plasma vitamin A (raised to 75% of normal level), and was cured of night blindness, but there was no appreciable increase in the liver reserves of vitamin A.—C. S. SAPSFORD.

MENSCHIK, Z. (1944.) **Vitamin E. and adipose tissue.**—*Edinb. med. J.* 51. 486-489. 1114

In female mice fed on a diet deficient in vitamin E but rich in fat, weight decreased and the subcutaneous and peritoneal fat disappeared after about 65 weeks. Mice receiving the same diet supplemented with 2.5 mg. of α -tocopherol daily gained considerably in weight, as the result of the deposition of large amounts of adipose tissue in various regions of the body.—E. M. C.

GULLICKSON, T. W., & CALVERLEY, C. E. (1946.) **Cardiac failure in cattle on vitamin E-free**

rations as revealed by electrocardiograms.—*Science*. 104. 312-313. 1115

Selected electrocardiogram recordings are presented, which were obtained on a heifer reared on a diet deficient in vitamin E, and bred from parents also reared on this diet. The series of electrocardiograms obtained on this animal, which died suddenly when two years old, revealed a gradual change, the later readings showing definite indications of cardiac abnormalities. In general, there was a decreased functional activity of the myocardium in the terminal stages of the deficiency, as indicated by the decrease in the potential of the deflection of the Q.R.S. complex, and by the increase in duration of the P.R., Q.R.S. and Q.T. intervals. There was some evidence of dissociation of atrial and ventricular impulses and possibly damage to the conducting tissues. Microscopic studies of heart sections showed atrophy and scarring of the cardiac muscle fibres. An increase in cellular elements was also noted, in some instances resembling, though on a smaller scale, the Aschoff nodules seen in human endocarditis.—E. M. CRUICKSHANK.

PEARSON, P. B. (1947.) **The thiamine, riboflavin, nicotinic acid and pantothenic acid contents of mare's colostrum and milk and ascorbic acid content of the milk.**—*J. Dairy Sci.* 30. 73-77. 1116

Mare's colostrum was found to contain an average of 38 μ g. of vitamin B₁, 138 μ g. of riboflavin, 160 μ g. of nicotinic acid and 747 μ g. of pantothenic acid per 100 ml. Mare's milk contained 16 μ g. of vitamin B₁, 40 μ g. of riboflavin, 50 μ g. of nicotinic acid, and 331 μ g. of pantothenic acid per 100 ml. Reduced ascorbic acid in mare's milk was found to be 11.8 mg. per 100 ml. The concentration was about five times greater than the ascorbic acid content of cow's milk. The content of vitamin B₁ and riboflavin in mare's colostrum was significantly lower than that of cow's colostrum. Pantothenic acid in mare's colostrum was on the other hand significantly higher than found in other species.—E. KODICEK.

FAIRBANKS, B. W., KRIDER, J. L., & CARROLL, W. E. (1945.) **Distillers' by-products in swine rations. III. Dried corn distillers' solubles, alfalfa meal, and crystalline B-vitamins compared for growing-fattening pigs in drylot.**—*J. Anim. Sci.* 4. 420-429. 1117

A basal ration consisting of ground yellow maize, wheat flour middlings, soya bean meal, fish meal, tankage, minerals and fortified cod-liver oil was fed to 13 weanling pigs which had been kept in drylot from birth. Another group of 11 pigs was given the basal ration supplemented

with 150 mg. vitamin B₁, 500 mg. nicotinic acid, 150 mg. riboflavin, 600 mg. calcium pantothenate, 250 mg. pyridoxine and 150 g. choline chloride per 100 lb. of feed. A third group was fed on the basal ration with 6% dried corn distillers' solubles and the fourth group was given the basal ration with 10% of alfalfa meal. The performance of the pigs of the various groups was compared. In the group fed on the basal ration alone, four deaths occurred, the average daily gain was 0.79 lb. and 419 lb. feed eaten for 100 lb. gain. The second group gained daily 1.17 lb. and consumed 377 lb. of feed for 100 lb. gain; the third group having distillers by-products showed an average gain of 0.93 lb. and consumed 379 lb. per 100 lb. gain. The fourth group supplemented with alfalfa meal gained almost as much as the group with vitamin supplements, i.e., 1.12 lb. daily. The food consumption was 405 lb. for 100 lb. gain. The feet, legs, gaits, hair coats of the pigs of this last group were more nearly normal than those of any other group. The diet may have supplied other factors than those known to be required by the pig. Pigs reared and nursed from sows receiving a fortified ration during lactation showed a better performance during the post-weaning tests. Losses through death during the experimental period were reduced fourfold. The lumbar spinal cord and the sciatic nerve of two pigs showing "goose stepping" were histologically examined. In the severe "goose stepper" a rather marked demyelination of the fibres of the sciatic nerve was present accompanied by moderate proliferation of the Schwann cells. Considerable oedema was found surrounding some of the nerve bundles. The changes in the nerves of a mildly affected pig were similar, but less marked.—E. KODICEK.

I. BOLTON, W. (1944.) **The riboflavin requirement of the White Wyandotte chick.**—*J. agric. Sci.* 34. 198-206. 1118

II. BOLTON, W. (1947.) **The riboflavin requirement of the White Wyandotte chick. II. Pure crystalline riboflavin as the vitamin supplement.**—*Ibid.* 37. 316-322. 1119

III. BOLTON, W. (1947.) **The riboflavin requirement of the White Wyandotte chick. III. The rates of depletion of the tissues.**—*Ibid.* 37. 323-328. 1120

I. Results of a series of experiments indicated that White Wyandotte chicks require at least 3.0 μ g. riboflavin per g. food, as assayed fluorimetrically, for optimum growth to six weeks of age; this requirement is the same as that for optimum efficiency of food utilization over the same period.

For the prevention of curled-toe paralysis a

slightly higher content, *viz.*, 3.6 $\mu\text{g.}$ per g. food was necessary.

The riboflavin content of the livers of birds reared on rations containing about 3.6 $\mu\text{g.}$ riboflavin per g. food was approximately 37 $\mu\text{g.}$ per g. It is therefore suggested that rations were deficient in riboflavin in cases where the livers contained less than 35 $\mu\text{g.}$ riboflavin per g. at about six weeks of age, and that the riboflavin content of the liver may be a more satisfactory criterion of riboflavin requirement for full well-being than the amounts necessary to give optimum growth and prevention of curled-toe paralysis.

II. After depleting riboflavin reserves by feeding a riboflavin deficient diet (1.3* $\mu\text{g.}$ riboflavin/g. food) from hatching to 14 days of age the experimental chicks were divided into eight groups each of 22 chicks and maintained on a riboflavin deficient diet to which supplements of pure crystalline riboflavin were added varying from 0 to 4.5 $\mu\text{g.}/\text{g.}$ food. Riboflavin values of liver, kidney, heart, leg muscles and breast muscles were estimated in 22 chicks killed at 14 days and in the rest at 42 days.

Results from the present experiment taken in conjunction with those from previous experiments [see I] indicate that the minimal requirement for optimal growth is 3.0 to 3.5 $\mu\text{g.}$ riboflavin/g. food, for optimal food consumption 3.0 $\mu\text{g.}/\text{g.}$ food and for prevention of curled-toe paralysis 3.6 $\mu\text{g.}/\text{g.}$ food.

All the tissues showed a maximal value when the diet contained about 4 $\mu\text{g.}/\text{g.}$ food. It is therefore suggested that the riboflavin content of the tissues may be a more satisfactory criterion of the minimal requirement for full well-being than the amounts necessary to secure optimal growth and for prevention of curled-toe paralysis.

At levels of riboflavin intake ranging from 1.7 to 6.2 $\mu\text{g.}/\text{g.}$ food the uric acid content of the blood plasma remained unchanged at approximately 6 mg./100 ml.

III. Riboflavin values of liver, kidney, heart and leg muscles were estimated at intervals on both riboflavin-deficient and riboflavin-adequate diets. In those on the deficient diet the heart and kidney tissues were almost depleted at the end of the first week while the leg muscles remained practically constant during that time and gradually decreased to minimum values at the end of the period.

Average riboflavin values on $\mu\text{g.}/\text{g.}$ tissue, in chicks from both groups at 86 days for liver, kidney, heart and leg muscles were respectively 19.0, 19.0, 7.0 and 1.5 for the deficient group and 34.0, 32.0, 18.0 and 4.5 for the riboflavin-adequate groups

The incidence of curled-toe paralysis was severe in one group on the deficient diet but was absent in another deficient group in which growth was slower and the birds were killed at 22 days of age and the disease may therefore not have had time to develop.

Observations on the composition of the liver during the first three weeks after hatching in chicks on the deficient diet showed that at hatching and during the first week half the chick's liver consisted of oil; this proportion fell during the second week towards normal levels. The crude protein expressed as a percentage of the fat-free dry matter was practically constant after the first week.

—R. ALLCROFT.

DYRENDALH, S. (1945.) Överdoserings av vitamin B₁ och därav förorsakade hudskador hos försöksråttor. [Overdosage of vitamin B₁, causing skin lesions in rats.]—*Skand. VetTidskr.* 35. 737–760. [Abst. from English & German summaries.] 1121

Rats fed with 7 and 9 I.U. of vitamin B₁ per day showed skin lesions with multiple necrotic foci in the skin, after 80–90 days, others fed smaller doses showed same skin lesions after longer period. Lesions healed in 18–20 days when vitamin B₁ was withheld. Attempts to heal lesions by addition of vitamins B₂ B₆ and pantothenic acid failed.

—E. V. L.

COOPERMAN, J. M., ELVEHJEM, C. A., MCCALL, K. B., & RUEGAMER, W. R. (1946.) "Folic acid" active compounds in the nutrition of the monkey.—*Proc. Soc. exp. Biol., N.Y.* 61. 92–97. 1122

A folic acid deficiency has been produced in three monkeys. In two animals the deficiency precipitated a complicating deficiency of the monkey anti-anaemia factor characterized by poor growth, low haemoglobin levels and high neutrophile count. Crystalline vitamin B₁₂ and the synthetic *Lactobacillus casei* factor were effective in curing the folic acid deficiency when fed at a level of 100 $\mu\text{g.}$ per day. The vitamin B₁₂ conjugate was less active at levels of 200–300 $\mu\text{g.}$ per day.

Liver concentrates containing vitamins B₁₀ and B₁₁, but low in "folic acid" activity, were inactive.—E. KODICEK.

OLSSON, E. (1945.) Erfarenheter från praxis vid behandling av bristsjukdomar hos nötkreatur. [Experiences in the treatment of deficiency diseases of cattle.]—*Skand. VetTidskr.* 35. 419–433. [English summary.] 1123

The first part of this paper is an account of

the geographical evidence of deficiency diseases of cattle in Dalarna (Dalecarlia), Sweden, where O. has tried to correlate them with data from herbage analyses. The diseases are "skravelsjuka", stiff sickness, acetonaemia and milk fever and possibly other ill-defined conditions which may represent mixed deficiencies.

The introduction of molasses into cows' rations has resulted in a definite decrease in deficiencies, especially "skravelsjuka", but some farmers are said to neglect to apply the appropriate pasture fertilizers which would be even more effective in some cases.

Vitamin B therapy has greatly reduced loss from deficiency disease and special proprietary preparations are available, such as "ewomin" consisting of dried yeast and containing fractions of the vitamin B complex with vitamins A and D added, and "jermin" (fractions of vitamin B complex only). Another useful preparation for the treatment of acetonaemia is "adynol compositum" consisting of adenosine triphosphate with creatine. [Carlström has dealt with the scientific aspects. See following abst.] Adynol therapy upsets cows somewhat causing two or three days anorexia after administration and dizziness and dyspnoea immediately after intravenous injection, but this can be avoided by a slow rate of injection. Some cases of severe acetonaemia do not respond well to adynol alone but do respond to an additional injection of 100 g. glucose and 0.1 g. creatine solution intravenously. Some illustrative case records are given. After treatment with molasses, sodium phosphate and ewomin has given good results and appears to prevent additional attacks. It is best given for one month before calving.

Dropsy of the foetal membranes is evidently part of a vitamin B deficiency as the giving of this vitamin in large doses alleviates it. Formerly this condition led to a loss of life of affected cows. Stiff sickness in young cattle also responds to vitamin B therapy. Milk fever in Dalarna often fails to respond to calcium but does so to calcium + vitamin B. For prophylaxis O. used for some years herring meal, but when this became unobtainable a change to cod meal proved to be less effective. Fish liver oil however was very effective not only for prevention, but also for treatment. Some case records are quoted to show good response to vigantol [? a vitamin D preparation] injections after calcium with vitamin B had failed to get the cow up.

Calves which develop poorly in spite of having plenty of whole milk benefit from multiple vitamin therapy. In order that their ration may be widened O. advises that the milk supply be curtailed, with the object of stimulating an early

taste for herbage crops. This interesting clinical account of experiences in a part of Sweden should be read with attention, but the conclusions drawn are probably not valid for other countries having different climatic and animal dietetic conditions.

—J. E.

CARLSTRÖM, B. (1944.) Adynol och adynol compositum. [Adynol and adynol compositum.] —*Skand. VetTidskr.* 34. 222–227. [English summary.] 1124

Recent researches have drawn attention to disorders of carbohydrate metabolism as causes of a number of diseases in animals and man. In one of these conditions the pyruvic acid content of the blood is raised and the remedy is vitamin B₁ therapy. Post-parturient acetonaemia in cows and rheumatic affections in various animals are associated with normal or depressed blood pyruvic acid together with depressed citric acid. The result is inability to convert fat into carbohydrate and consequently acetonaemia. C.'s researches into these conditions have drawn attention to the importance of phosphorus and the phosphorylation mechanism, which is defective, but it can be actively influenced by the administration of adenosine triphosphate. This has been demonstrated and a commercial preparation is available under the name "adynol". As a result of further research it was found that additional treatment with creatine is also of greater value than "adynol" therapy alone. So "adynol compositum" containing both substances has also been made available for the treatment of severe cases of acetonaemia and "rheumatic" disease.

A fully effective treatment for cases of any degree of severity is now available through aneurin (thiamine) and "adynol compositum". Conditions definable as muscular rheumatism also respond well to the latter, both human and animal cases. Particulars have been published elsewhere.

—J. E.

SCOTT, M. L., NORRIS, L. C., HEUSER, G. F., & BRUCE, W. F. (1945.) Studies on organic factors required for prevention of anemia in chicks.—*J. biol. Chem.* 158. 291–298. 1125

When chicks were fed a purified diet containing 1% of succinyl sulphathiazole, growth was poor and a macrocytic hypochromic anaemia developed. When α - or β -pyracin or the *L. casei* factor were fed singly, growth was not improved, nor the anaemia prevented, but the addition of the *L. casei* factor did largely prevent the mortality which occurred on the basal diet. Either α - or β -pyracin when fed in conjunction with the *L. casei* factor was completely effective in preventing the anaemia and growth was also considerably improved. β -pyracin was much more active in

promoting growth than α -pyracin, but only slightly more effective in preventing anaemia. Smaller quantities of β -pyracin and the *L. casei* factor were required to prevent anaemia than to promote growth. When the diet was supplemented with the *L. casei* factor alone, a normocytic, hypochromic anaemia developed. When β -pyracin only was added, the anaemia was of a macrocytic, normochromic type.—E. M. C.

I. NALBANDOV, A. V., & CARD, L. E. (1944.)

The problem of blood clots and meat spots in chicken eggs.—*Poult. Sci.* 23. 170–180. 1126

II. NALBANDOV, A. V., & CARD, L. E. (1947.)

The problem of blood and meat spots in chicken eggs. II. Its importance in poultry flocks, and a study of the nutritional factors involved.—*Ibid.* 26. 400–409. 1127

I. Observations show that while bleeding may occur at the time of ovulation this happens rarely and in most cases the bleeding is intra-follicular. If the haemorrhage is small it remains attached to the yolk, but more copious bleeding leads to the formation of large clots which may separate from the yolk and remain suspended in the white. The so-called “bloody whites” are thought to arise from the dissolution of a blood clot. Meat spots are regarded as blood spots which have undergone change as a result of alteration in the environmental temperature or of the pH.

Vitamin treatment of birds laying eggs with these defects, using vitamins A, C, D, E, K and P had no effect. The incidence of blood clots decreased when birds were put on free range, but the feeding of green food and soil, and exposure

See also *abst.* 1244 (digestion of lignin).

to ultra violet radiation did not produce results in housed birds comparable to those in birds on free range. The tendency to ovarian haemorrhage seems to be inherited. In 60% of the birds observed there was a decrease in clot production in the second and third years. The presence of clots does not interfere with hatchability.

II. Only 75% of 3,600 eggs from Leghorns were free from blood clots and/or meat spots and the general incidence in 20 Leghorn flocks averaged 12.5% blood clots and 12.8% meat spots. In 3,600 eggs from heavy breeds examined only 57.2% were free from both defects and 36.7% showed blood clots and 6.1% meat spots.

The incidence of bleeding was substantially reduced by putting the birds on free range or by feeding with “cerogas”. This is a commercial preparation consisting of dehydrated unjointed young grasses. The factor or factors concerned could not be identified but these are not identical with any known vitamins.—D. LUKE.

BYERRUM, R. U., & DuBOIS, K. P. (1947.) **The influence of diet on the susceptibility of rats to alpha-naphthylthiourea.**—*J. Pharmacol.* 90. 321–329. 1128

A diet high in cystine (and adequate in choline) provided rats with some protection against the thiourea for about 30 days. Iodide in the drinking water or in the diet protected against large doses of the thiourea. The intravenous injection of iodide immediately before the administration of the thiourea gave no protection, nor did a diet containing 12.5 mg. of desiccated thyroid per g. fed for a two-day period.—J. M. ROBSON.

DISEASES, GENERAL

BRUINS, B. (1947.) **Endogene intoxicaties. [Endogenous intoxications.]**—*Tijdschr. Diergeneesk.* 72. 322–327. 1129

Eight case records of sickness in horses are described. The main characteristic was extreme dullness which in a few cases was followed by death.

On the advice of Prof. Seekles, arecoline injections were given to the last four cases and this appeared to bring about recovery.

The nature of the disease is obscure and the designation “endogenous intoxication” is a tentative diagnosis. Protein-rich food appeared to play a part in causation.—J. E.

JENNINGS, A. R., & HIGHER, D. R. (1947.) **Some cases of purpura haemorrhagica in the horse.**—*Vet. J.* 103. 369–376. 1130

The literature relating to purpura, particularly in horses, is reviewed. During an outbreak of laryngo-tracheitis among heavy draught horses in 1947 about 500 horses were affected and 11

cases of purpura were encountered. Eight of these and two others are described in this paper.

Detailed blood examinations were carried out every 48 hours as follows:—red and white cell counts, platelet and differential leucocyte counts, haemoglobin estimation and packed cell volume. The icteric index was also determined.

In no case was there any marked thrombocytopaenia. A degree of anaemia was found and all fatal cases had red cell counts of about 5 million per ml. The majority showed a marked leucocytosis due mainly to a neutrophilia with a strong shift to the left (Arneth). There was a relative lymphopenia. The mean icteric index of the cases of purpura was 19. Blood sera of ten healthy horses gave a mean value of ten.—D. LUKE.

DARDILLAT, M. (1947.) **Une maladie saisonnière des bovidés. [A seasonal disease of cattle of unknown etiology.]**—*Rec. Med. vét.* 123. 68–69. 1131

The disease described has been encountered over a number of years in the Creuse department of central France. It principally attacks cattle about 18 months old, but cases have occurred in young calves. Only 11 cases have been encountered in adult cattle. The disease is seasonal, occurring from July to the end of October, and does not appear to be contagious, as cases occur singly.

The symptoms have varied during the years, the earlier cases being associated with bellowing and later cases with blood-stained sweating, but these symptoms have disappeared. The only constant symptom is fever with loss of appetite. In the later stages haemoglobinuria may occur. Fly bites may leave a trickle of blood indicating a dilatation of the subcutaneous vessels.

The fever and the P.M. lesions have however remained constant, the latter consisting of blood extravasations on the abdominal muscles, the visceral peritoneum and the gall bladder, congestion of the liver, and in the later stages inflammation of the peritoneal cavity, that and the bladder containing blood-stained fluid. The kidneys are congested.

Material sent for laboratory examination has usually proved sterile. No treatment has proved of value.

It is suggested that in certain respects the condition resembles bovine leptospirosis described in Russia.—U. F. RICHARDSON.

BLAXLAND, J. D., & MARKSON, L. M. (1947.) **Toxic heart degeneration, or "Round heart disease", of poultry.**—*Vet. J.* 103. 401–405. 1132

A condition is described in pullets which were entered in a commercial laying test in the North of England in 1946–47. There were 1,178 birds in the test from all parts of England and Wales.

Three deaths from heart disease occurred in December, 1946, and from Jan. to April, 1947, 65 deaths were recorded due to this condition. Deaths in every case were sudden though some of the birds were dull for a few days before death. Birds which died had not been in lay for some time.

See also *absts.* 1033 (haemorrhagic diathesis) 1115 (heart failure); 1249 (handbook on poultry diseases).

P.M. findings were those of acute cardiac failure. The most prominent abnormality was seen in the heart which was enlarged in volume and increased in weight. The heart muscle appeared degenerated, pale in colour and rather fatty with, in some cases, the apex invaginated. Microscopically there were degenerative changes with cloudy swelling, fatty degeneration and, in some cases, actual necrosis. Myocardial oedema was commonly seen. Lungs, liver, spleen and kidneys showed acute passive hyperaemia. It was concluded that, in most cases, these changes would only take a few days to develop. Bacteriological examination was negative. Transmission experiments to adults, baby chicks and chick embryos were unsuccessful.

The sporadic nature of the deaths did not indicate that an infectious agent was implicated. No dietetic factor could be incriminated. The condition is compared with a similar condition recorded in Northern Ireland, Scotland and New Zealand.—D. LUKE.

ARLEIN, M. S. (1947.) **Generalized acute cutaneous asthenia in a dog.**—*J. Amer. vet. med. Ass.* 111. 52–53. 1133

An unusual skin condition in a dog is described. Moderate pressure, or stretching, at any point caused complete rupture of the skin which was soft, white, pliable and putty-like. The dog was destroyed on humanitarian grounds and P.M. and laboratory findings were inconclusive.

—J. DEANS RANKIN.

JANSEN, J., & PEPPERKAMP, C. W. A. N. (1947.) **Overzicht der onderzoekingen van het uit de praktijk ingezonden ziektemateriaal in 1945. [Report of investigation of material sent by practitioners during 1945.]**—*Tijdschr. Diergeneesk.* 72. 134–139. [English summary.] 1134

The material comprised 402 specimens from 17 species of animals.

Attention is directed especially to the cultural characters of a streptococcus isolated from horses this organism differing from both *Str. equi* and *Str. pyogenes*. *Erysipelothrix rhusiopathiae* was diagnosed in a young pig.—J. E.

POISONS AND POISONING

SOMERS, G. F. (1947.) **Relative oral toxicity of some therapeutic iron preparations.**—*Brit. med. J.* August 9th. 201–203. 1135

Very large doses of certain soluble iron salts are toxic to rabbits, g. pigs and mice. The iron content of the median lethal dose per kg. varied from 0.6 g. to 3.8 g. The possible mode of action of the preparations is discussed. P.M. and

histological examinations have given no positive information. The results show, however, that the ratio between the toxic and the therapeutic doses is very high.—J. M. ROBSON.

BODDIE, G. F. (1947.) **Fluorosis in domestic animals.**—*Vet. Rec.* 59. 301–303. 1136

An outbreak is described occurring in an area adjacent to an aluminium factory in Scotland

where cryolite (a sodium aluminium fluoride) is used as a flux.

Details of the clinical signs observed in affected cattle and sheep are given:—the dental changes involved, mottling, hypoplasia and abnormal brittleness of the enamel of the permanent teeth of animals grazing on contaminated pasture during the period of formation of the permanent teeth. Temporary and deciduous teeth were not affected and adult animals whose permanent teeth had erupted before ingestion of abnormal amounts of F grazed without ill effects to teeth or bones, provided the rate of ingestion of F was not too high (no figures given). Ingestion of greater amounts of F resulted in osteodystrophia in cattle and sheep of any age, while still greater amounts caused the development of osteomalacia accompanied by symptoms of general debility, loss of appetite, stiffness, lameness and articular pain.

It is pointed out that estimation of F content of urine samples provides a convenient method of confirming suspected cases of fluorosis.—R. A.

IRVING, J. T. (1946.) **Action of fluorine on the teeth of rachitic rats.** [Correspondence.]—*Nature*. 158. 949. 1137

When excess fluorine was fed to young rats the appearance of a fine hypercalcified line in the predentine of the teeth was shown to depend on the level of calcium in the blood.

Rats fed a diet with a low (0.25:1) Ca:P ratio show the usual symptoms when NaF is injected into the blood stream, but the symptoms can be prevented if the level of blood calcium is temporarily raised by the administration of 27 i.u. vitamin D two days earlier.

Rats fed a diet with a high (4:1) Ca:P ratio were starved for periods from 1–8 days to lower the blood calcium level. When NaF was injected the rats that showed the severest symptoms were those that had been starved the longest.—G. L. B.

MCCLURE, F. J., & KORNBERG, A. (1947.) **Blood hemoglobin and hematocrit results on rats ingesting sodium fluoride.**—*J. Pharmacol.* 89. 77–80. 1138

The effect on haemoglobin and haematocrit values was studied of the addition of 50 p.p.m. fluorine to the drinking water of several different strains of rats maintained on various diets over periods varying from 86 to 365 days.

No differences between control and experimental groups were observed and the results indicate that this amount of F which was sufficient to produce noticeable bleaching and striated appearance in the rats' incisors had no effect on Hb concentration and total red cell volume in their blood.—R. ALLCROFT.

ANON. (1946.) **Derivatives of thiouracil.**—*Brit. med. J.* Dec. 14th. 905. 1139

An annotation in which some of the toxic effects of inadequately controlled dosage with thiouracil of hyperthyroid cases are discussed and a lucid description given of the use of two substituted thiouracils, *viz.*, 6-ethylthiouracil and 6-*n*-propylthiouracil. These substances, especially the latter, show greater efficiency in the reduction of thyroid secretion and less liability to produce toxic reactions than thiouracil. It is clear also that the dose of 6-*n*-propylthiouracil required for both initial and maintenance therapy is many times smaller than that of the parent compound and is also more specific in its action and in consequence is freer from side-effects.—R. ALLCROFT.

DYBING, O., & DYBING, F. (1945.) **Påvisningen av stryknin ved strykninforgiftning hos hund.** [Detection of strychnine in strychnine poisoning in dogs.]—*Norsk VetTidsskr.* 57. 15–18. 1140

The technique of chemical analysis used in these cases is outlined, with special reference to the gold chloride reaction with strychnine. Although not strictly specific (other alkaloids give the reaction), the strychnine-gold chloride compound which is formed can be broken down and the suspected strychnine part tested for toxic action on mice, etc.—J. E.

GUSYNIN, I. A. (1940.) **Toksikologicheskoe znachenie polyni Artemisia taurica M.B. dlya zhvachnykh zhivotnykh.** [Toxicological importance of *Artemisia taurica* for ruminants.]—*Veterinariya, Moscow*. No. 3. pp. 76–78. [French summary.] 1141

G. examined the effect of *Artemisia taurica* on sheep by means of short and long term feeding tests.

It is known to be dangerous to horses and his results show that it is toxic also to sheep. The clinical signs of poisoning are the same as in horses, notably a very pronounced hyperaesthesia. The toxic dose, based on dry material as found in the hay, varies from 200–300 g.; the lethal dose is 500 g.

Hay containing the dried plants is usually responsible for the poisoning of sheep and horses. Poisoning from grazing at pasture is less frequent.

Ruminants are somewhat less susceptible than are horses.—S. W. SALTER.

LAGNEAU, F., & GALLARD, P. (1946.) **Intoxication des bovins par l'oeillette.** [Poisoning of cattle by poppies (*Papaver somniferum*).]—*Rec. Méd. vét.* 122. 310–313. 1142

Revival of the practice of growing poppies (*Papaver somniferum*) in France for the production of edible oil has resulted in the feeding and littering down of cattle with the residues, and this in

turn has led to a considerable increase in the number of cases of poisoning. The symptoms include marked gastro-enteritis and excitation of the central nervous system accompanied by inappetence, inco-ordination of movement and colic. The condition is rarely fatal but recovery is slow and prolonged and is associated with general unthriftiness, loss of weight and cessation of milk production, and affected animals become an economic loss. General treatment consists of administering purgatives and stimulants, and recommendation has been made of a ferric sulphate antidote. The active principles responsible for the toxic symptoms appear to be the alkaloids, principally morphine, associated with the stems and capsules of the poppies.—A. EDEN.

I. EVERIST, S. L. (1947.) **Plants poisonous to sheep.**—*Qd. agric. j.* 64. 13-25. 1143

II. EVERIST, S. L. (1947.) **Plants poisonous to sheep.**—*Ibid.* 64. 82-95. 1144

III. EVERIST, S. L. (1947.) **Plants poisonous to sheep.**—*Ibid.* 64. 139-163. 1145

This is the first of a series of three articles on plants commonly regarded as poisonous in the sheep-raising areas of Queensland. Some general notes are provided on the factors affecting the toxicity of plants, the procedure to be adopted in investigating an outbreak of poisoning and the common methods of treatment and prevention. Yellow-wood (*Terminalia oblongata*) produces symptoms of hyperaesthesia and toxic convulsions in sheep, and of ocular and nasal discharge with photophobia, oedema of the brisket and frequent urination in cattle: boonaree (*Heterodendron oleifolium*) and fuchsia bush (*Eremophila maculata*) contain cyanogenic glucosides. Heart-leaf poison bush (*Gastrolobium grandiflorum*) causes many deaths in sheep without warning symptoms.

II. In a continuation of a previous article, poisoning in stock due to ellangowan poison bush (*Myoporum deserti*), caustic vine (*Sarcostemma australe*), weir vine (*Ipomaea calobra*), soda bush (*Threlkeldia proceriflora*), mint weed (*Salvia reflexa*), wild sunflower (*Verbesina encelioides*) and sunflower daisy (*Wedelia asperrima*), are described.

III. Further information is given on poisoning due to plants in sheep-raising areas in Queensland. The plants described are darling pea (*Swainsonia galegifolia*), dwarf darling pea (*Swainsonia luteola*), thorn apple (*Datura leichhardtii*), wild tobaccos (*Nicotiana* spp.), caustic creeper (*Euphorbia drummondii*), bottletree caus-

tic (*Euphorbia eremophila*), flax weed (*Pimelea trichostachya*), common native couch (*Brachyachne convergens*), andrachne (*Andrachne decaisnei*), red crumbweed (*Chenopodium blackianum*), malvastrum (*Malvastrum spicatum*) and wild parsnip (*Didiscus glaucifolius*). Some notes are also provided on plants causing photosensitization.

—D. C. BLOOD.

MOUGEOT, M. Y. (1946.) Sur une localisation oculaire d'accidents de photosensibilisation. [**Ocular localization of photosensitization lesions in horses and mules.**]—*Rev. Méd. vét. Lyon et Toulouse.* 97. 312-314. 1146

An outbreak of photosensitization occurred amongst horses and mules grazing fields of lucerne, regularly irrigated throughout the summer. At the initial outbreak the parts of the animals affected included the head, nostrils, feet and pasterns, treatment was impracticable owing to labour difficulties associated with gathering the animals regularly and the lack of alternative feeding stuffs. This manifestation of the condition gradually improved but one or two other horses showed signs of partial blindness exhibiting photophobia, keratitis, conjunctivitis and profuse lachrymation without other parts of the body being affected. The possibility of a rickettsia-like infection in horses was ruled out. The condition gradually improved, treatment still being impracticable, and although further animals showed ocular troubles without noticeable lesions elsewhere, this condition cleared up towards the end of the summer. The disease appeared to be a photosensitization, due to the reflection of the bright sunshine from water on the irrigated lucerne, affecting only the eyes of certain animals, in contrast with the more usual skin lesions associated with this condition of photo-sensitization.—A. EDEN.

ANON. (1946.) **Thyroid poisoning.**—*Brit. med. j.* Dec. 14th. 906-907. 1147

The question is discussed of why an occasional patient should develop thyrotoxicosis often after taking small doses of thyroid for only a few weeks when thousands can take it for years with impunity. Several hypotheses are considered briefly and whatever is the true explanation it is pointed out that even in myxoedema but especially when there is no underactivity of the gland, thyroid extract should be administered with special care to those whose personal or family history suggests a tendency to thyrotoxicosis.

—R. ALLCROFT.

PHARMACOLOGY AND THERAPEUTICS

FAHRAEUS, R. (1944.) Les trois époques principales de la thérapeutique. [**The three principal epochs in therapeutics.**]—*Acta path. microbiol.*

scand. Suppl. No. 54. pp. 353-363. [In French.] 1148

A generalization of the history of the develop-

ment of therapeutics from pre-scientific times.

—E. COTCHIN.

GODFRAIN. (1942.) A propos de nos approvisionnements en produits pharmaceutiques. [The supplies of pharmaceutical products in France.]—*Rev. Méd. vét., Lyon et Toulouse*. 93. 19-24. 1149

An annotated list of pharmaceutical products in short supply during the war. Control of animal parasites was especially endangered by the shortages. The use of chaulmoogra oil had been successful in treatment of demodectic mange.

—T. H. FRENCH.

FRANCIS, J. (1947.) Bacterial chemotherapy in veterinary medicine.—*Vet. Rec.* 59. 131-137. 1150

This is a review which contains much original work. The blood levels of various sulphonamides produced in different species are given and graphically represented. Diaminodiphenyl sulphone produces the most persistent blood levels in the domestic animals except in the pig where its place is taken by sulphamethazine. This drug and sulphamerazine produce good blood levels in most species, being markedly superior to sulphadiazine and sulphapyridine which in turn are much better than sulphathiazole. Taking into consideration the relative activities of the compounds and their toxicity (sulphone is toxic in many species), it is concluded that sulphamethazine and sulphamerazine are probably best for the treatment of pneumonia in cattle, sheep and pigs. Sulphaguanidine is contra-indicated for treating the enteric diseases of animals and the other sulphonamides are more effective. Sulphanilamide is quite effective in respiratory disease due to streptococci. In the farm animals, an initial dose of 0.1 to 0.2 g./kg. of sulphonamide followed by a daily dose of 0.05 to 0.1 g./kg. is adequate.

Mastitis associated with *Str. agalactiae* is probably an infectious disease which can be eradicated from a herd, area or country. In this it differs from other forms of mastitis. Acriflavine is the best antiseptic for injection into the cow's udder. Suspensions of sulphonamides in oil are superior to the soluble preparations for injection into the udder; penicillin is of special value in this condition but is, apart from this, less valuable in veterinary than in human medicine.

—J. M. ROBSON.

HARRIS, L. E. (1946.) Penicillin therapy in veterinary medicine.—*M[ich.] S[t.] C[oll.] Vet.* 6. 17-21. 1151

A general review of the methods of administration and clinical uses of penicillin in veterinary practice. After subcutaneous or intramuscular

injection the concentration in the blood quickly reaches its maximum and practically all is excreted in the urine within four hours. Extremely little or none at all reaches the udder from the blood stream. In the treatment of systemic infection, or localized infections which are inaccessible by topical application, it is better to give frequent doses rather than too large a dose at one time. For local application to infected areas, a solution containing 250-500 units per ml. should be kept in continuous contact. For general use the average dose given is 10,000-20,000 units per 100 lb. body weight every three hours. Special conditions may require a larger or smaller dose. The most important use of penicillin is in the treatment of chronic bovine mastitis by intramammary infusions. The staphylococcal type is more resistant than is the streptococcal infection. Other conditions in which good results can be expected include strangles, equine pneumonia, blackquarter and the initial stages of leptospirosis and other septicaemic conditions of dogs. Successful penicillin therapy is most likely to be achieved when it is given early, in sufficiently large doses, frequently enough to maintain adequate blood levels and when it is continued for 1-2 days after the temperature returns to normal and recovery appears assured.—J. KEPPIE.

HARRISON, P. E. (1946.) Comparative effect of penicillin and sulfonamide drugs on the immune response of rabbits to pneumococcus infection and the relation of immunity to bacterial chemotherapy.—*J. infect. Dis.* 79. 101-130. 1152

The outcome of an infectious process is the result of the interaction of the variables, pathogenicity, immune response and treatment when chemotherapeutic drugs are given. As no chemotherapeutic agent or antibiotic has yet been discovered which completely sterilizes the host of the infection, the efficacy is dependent on the development of an effective immune response. Delay in initiating treatment may allow the parasites to increase in numbers, produce toxins or establish themselves in foci where they are partially protected from the action of the antibody or drug. On the other hand too early initiation of treatment with a potent drug may remove the parasites too quickly so that no immunity is acquired.

Experiments were conducted with a virulent strain of pneumococcus injected intradermally into rabbits. The drugs used were sulphapyridine, sulphadiazine, sulphamerazine and penicillin. The first and the last were compared with one another and the remaining two were compared with sulphapyridine. After inoculation and treatment animals were examined daily and the state

of the lesions graded from + to + + + +. The blood was cultured daily and antibody titrations (agglutinin and protective antibody) were made on alternate days. All rabbits surviving were tested by re-infection. With penicillin and sulphapyridine treatment was initiated either four or 24 hours after infection.

When penicillin was administered four hours after infection no lesions developed. When penicillin was administered 24 hours after infection there was a marked lesion, some systemic reaction and a transient bacteraemia. With sulphapyridine there was no complete suppression of infection even with treatment four hours after infection while in the 24-hour group four animals died. With penicillin administered after four hours there was no antibody response whereas with the four-hour sulphapyridine there was marked protective antibody after two days but no agglutinin developed for six days and then only in minimal titres. In animals treated with sulphapyridine after 24 hours the development of both agglutinins and protective antibody were delayed and the titres were lower. There was a maximum antibody response in those animals treated with penicillin after 24 hours. The agglutinin response was not parallel to that of protective antibody. On re-infection all the animals in the four-hour penicillin group died after a longer time than a control series of animals. There were no deaths in the other three groups. When sulphadiazine and sulphamerazine were used the results were much the same as with sulphapyridine though the animals treated with sulphamerazine and sulphadiazine ate better. The animals also showed better antibody responses than when treated with sulphapyridine though not as strong as when treated with penicillin after 24 hours. On re-infection none died.

In well established infections rabbits treated with penicillin show an enhanced antibody response while those treated with the sulpha group of drugs do not. There are three possible reasons for this. (1) The sulphonamide drugs inhibit antibody; (2) penicillin stimulates antibody formation; (3) there is neither stimulation or inhibition of antibody formation, but due to the less effective drug action the infection persists and the consequent formation of fresh antigen "mops" up the antibody in greater amount and the titres are less.

When penicillin or sulphapyridine is administered along with a dead pneumococcus vaccine there is no effect on antibody response. When soluble specific substance (SSS) was given to the animals treated with penicillin after four or 24 hours or with sulphapyridine after four hours it was not detectable in the blood. In six of the

animals treated with sulphapyridine after 24 hours the SSS was detectable for 1-8 days. The injection of SSS along with penicillin prevented the appearance of antibody in the serum for six days. In the case of sulphapyridine treated animals to which SSS was administered there was a poor therapeutic response. Some experiments were also done on mice which gave similar results.

From the results given it would appear that successful penicillin therapy is relatively independent of an immune mechanism though some type of immunity cannot be excluded; it appears that the immune mechanism is much less important than in sulphonamide therapy.—A. A. W.

SEEBERG, V. P., ILLG, P. L., & BROWN, D. J.
(1946.) **The intestinal absorption of penicillin**
G.—*Science*. 104. 342-343. 1153

Studies were undertaken to ascertain whether the relative ineffectiveness of penicillin given *per os* as compared with parenteral injections, was due to the lack of intestinal absorption and subsequent destruction in the bowel by penicillinases. The experiments were carried out on 44 cats, previously fasted for 24 hours. Under dial-urethane anaesthesia, 0.1 millimole of penicillin per kg. of body weight was placed in the ligated duodenum, and absorption allowed to take place for periods up to three hours. The penicillin was dissolved in 2.5 ml. of normal saline per kg. At the end of the test period, the duodenal contents were analysed for penicillin, preliminary experiments having shown that under the conditions of the experiment the duodenal contents did not interfere with its assay. Control recoveries of penicillin from injected loops, removed and washed out immediately, averaged 98%. The absorption of sulphadiazine, which is satisfactorily absorbed from the intestinal tract, was studied under the same conditions. The absorption of penicillin was much slower than that of sulphadiazine, the recovery of the former averaging 56% after two hours, while that of the latter averaged 5% after one hour of absorption. It appears, therefore, that the major portion of an oral dose of penicillin passes through the duodenum unabsorbed and is destroyed in the lower portions of the intestine.

—E. M. CRUICKSHANK.

KIESEL, G. K., MORSE, E. V., & EVANS, W. M.
(1947.) **Treatment with penicillin of pyelonephritis in cattle.**—*Cornell Vet.* 37. 373-380. 1154

The effect of treatment with penicillin in a beeswax-peanut oil base of seven cases of pyelonephritis in the bovine is described, a total of 10-15 million units being administered over a ten-day period. Four of the seven cases apparently made complete recoveries.—J. DEANS RANKIN.

FLEMING, A., & FISH, E. W. (1947.) **Influence of penicillin on the coagulation of blood with especial reference to certain dental operations.**—*Brit. med. J.* August 16th. 242-243. 1155

High concentrations of penicillin may interfere seriously with blood coagulation and retraction of the clot. Where a firm blood clot is of importance, the wound should only be washed out with a solution of penicillin not exceeding 100 units per ml.; systemic penicillin should, of course, also be given where there is a risk of infection.

—J. M. ROBSON.

PANDALAI, K. M., & GEORGE, M. (1947.) **A possible mode of action of penicillin.**—*Brit. med. J.* August 9th. 210-211. 1156

Nucleic acid has no particular growth promoting effect on *Staphylococcus aureus*, but is strongly antagonistic to the bacteriostatic action of penicillin. This effect is still observed when the nucleic acid is added up to six hours after the penicillin has acted on the organisms. It is suggested that penicillin probably acts by interfering with a phase of the metabolism of the organisms which involves nucleic acid.—J. M. R.

GIFFORD, R., & JUNGHER, E. (1946.) **A report on penicillin treatment of swine erysipelas in turkeys.**—*M[ich.] S[t.] C[oll.] Vet.* 7. 18-19 & 40-41. 1157

Adult turkeys, on three different farms where *Erysipelothrix rhusiopathiae* infection had been diagnosed, were treated with intramuscular injection of penicillin. Complete recovery of ailing birds was effected by two injections of 25,000 Oxford units of penicillin in 2 ml. of saline given about eight hours apart.

The authors consider that penicillin treatment of early field cases of this disease is a practical and economic possibility. They suggest investigation of the value of a single injection in an oily vehicle.—J. D. BLAXLAND.

ERIKSEN, K. R. (1946.) **Studies on the action of penicillin on some rod-shaped, penicillinase-producing bacteria.**—*Acta Path. microbiol. Scand.* 23. 489-497. [In English. Author's summary slightly amended.] 1158

The action of penicillin on a very sensitive strain of *B. anthracis* and a slightly sensitive strain of *B. paracoli* was examined by "direct agar microscopy". In both cases strongly inhibitory penicillin concentrations gave lysis without preceding growth or swelling, while the lysis in the case of weaker concentrations was preceded by primary growth and swelling just as in the case of staphylococci and pneumococci. In all cases unchanged bacteria "persisters" were seen after the occurrence of the lysis and their number corresponded to the number of bacteria which did

not germinate on penicillin-free agar. Even under conditions where there was no possibility of growth penicillin had a lytic action; also here "persisters" were observed. Weak concentrations only acted where there was possibility of growth, no doubt because the action here was dependent on a "primary growth". Even very sensitive bacteria can produce penicillinase; in such case the penicillin action is highly dependent on the size of the inoculate.

PELLERAT, J., & MURAT, M. (1946.) **Action de la pénicilline sur la corne utérine du cobaye.** [The action of penicillin on uterine muscle.]—*C.R. Soc. Biol. Paris.* 140. 880. 1159

Penicillin (0.5 Oxford units per ml.) produces contraction of the isolated g. pig uterus which is not prevented by atropine. Much higher doses of penicillin produce no effect on the isolated intestine. The degree of purity of the preparation used is not mentioned.—J. M. ROBSON.

PILE, M., STEWART, D. D., & STANDFAST, A. F. B. (1947.) **Some observations on the use of penicillinase in sterility tests for penicillin.**—*J. gen. Microbiol.* 1. 244-250. 1160

Penicillinase should be used in a concentration sufficient to destroy penicillin before it has killed any contaminating organisms, if falsely negative results are to be avoided. It is suggested that a convenient unit of penicillinase activity is the quantity that will destroy 100 units of penicillin in 1 ml. in 1 hour at room temperature.—J. M. R.

ANON. (1946.) **Streptomycin. Status report on its therapeutic use.**—*Bull. U.S. Army med. Dep.* 6. 565-570. 1161

Streptomycin levels of 32 units per ml. *in vitro* are effective against more than 80% of Gram-negative bacteria and more than 60% of Gram-positive cocci commonly encountered in surgical infections. This level can be maintained by the intramuscular administration of 0.5 g. four hourly (3 g. a day). Oral administration is unsatisfactory. For local application 0.25 g. with 1 g. lactose and solutions containing 5-10 mg. per ml. can be used. Free drainage should be insured and untreated or unsterilizable foci should be eliminated. Its use is attended by danger of serious toxic reactions and hence streptomycin should be used with caution and only in critically ill patients.—J. M. ROBSON.

COURMONT, P., GARDÈRE, H., & DERIES, G. (1947.) **Action antibiotique de la pénicilline sur les cultures troubles homogènes du Bacille de Koch S.A., P.C.** [The action of penicillin on cultures of *Mycobacterium tuberculosis*.]—*C.R. Soc. Biol. Paris.* 141. 119-122. 1162

In a homogeneous liquid culture (without clumps) of a human strain, bacteriostatic effects

were obtained in 5-15 days with concentrations of penicillin of 10-1,250 units per ml. Concentrations of 2,500-5,000 units per ml. were bactericidal. These results may be significant in the treatment of certain forms of TB.—J. M. ROBSON.

DONOVICK, R., & RAKE, G. (1947.) **Studies on some biological aspects of dihydrostreptomycin.**—*J. Bact.* **53**. 205-211. [Authors' summary copied *verbatim*.] **1163**

Dihydrostreptomycin, which is an antibiotic compound derived from streptomycin by reduction with hydrogen, has *in vitro* activity equal to that of streptomycin for some bacterial species, but for others its activity is only a fraction that of streptomycin. In the case of one strain of *Mycobacterium smegmatis* its activity is slightly greater than that of streptomycin.

Changes in pH and tryptone concentration in test broths affect the anti-bacterial activities of streptomycin and the dihydro compound similarly.

Two species of bacteria resistant to streptomycin were also shown to be resistant to dihydrostreptomycin.

The excretion rates of these two compounds as well as their toxicities in mice are very similar.

CORPER, H. J., & COHN, M. L. (1947.) **The remote sustained threshold therapeutic action of streptomycin in tuberculosis.**—*Science*. **106**. 446-447. **1164**

The purest and highest titre of streptomycin obtainable (1,000,000 units per g.), given intravenously, was tested on g. pigs previously infected with 1 mg. of virulent human type tubercle bacilli administered intravenously. A single injection of 50,000 units was not lethal but doses of 100,000 units frequently killed both test and controls.

Six g. pigs were given 25,000 units daily for 82-91 days and infected one day after the last treatment. The average duration of life was 29 days, 21 days in six controls. The same dosage given for only 14 days yielded little difference in average survival rates (pretreated 22 days: controls 21 days).

In comparable experiments with the same dose given on four days, on five consecutive days and on ten consecutive days respectively according to the volume of dosage individual animals died of generalized TB. regardless of the dosage.

A comparison of the weights of infected g. pigs with non-infected control g. pigs is given in a graph.

The authors conclude that the effect of treatment with streptomycin persists for some time, that it is of no benefit to force treatment above maximum threshold value and that the frequency of dosing can be reduced.—J. D. R.

DUBOS, R. J., DAVIS, B. D., MIDDLEBROOK, G.,

& PIERCE, C. (1946.) **The effect of water soluble lipids on the growth and biological properties of tubercle bacilli.**—*Amer. Rev. Tuberc.* **54**. 204-212. [Spanish summary.] **1165**

The addition of water-soluble lipoids and of serum albumin to simple synthetic media allows rapid and diffuse growth of virulent tubercle bacilli, in contrast to that obtained in the classical bacteriological media. Liquid media containing a water-soluble synthetic ester of oleic acid and serum albumin allow growth of tubercle bacilli which retain their characteristic morphology, staining properties, virulence and immunological specificity. It is suggested that the use of such media may facilitate the study of some of the main problems in tuberculosis research.—M. C. L.

VALLENTIN, G. (1946.) **Clinical experiences in the treatment of pulmonary tuberculosis with PAS.**—*Svenska Läkartidn.* **43**. 2047. [Abst. in *Amer. Rev. Tuberc.* **55**. No. 6. pp. 169-170 of absts. (1947.), copied *verbatim*. Signed: W. C. TOBIE.] **1166**

In treating tuberculosis, 4-aminosalicylic acid (p-aminosalicylic acid) (PAS) was usually given by mouth for three to four weeks, with one-week intervals without treatment. The daily dosage was 5, 3, 3 and 3 g., given at four-hour intervals. During treatment the average blood level was 5 mg. of PAS per 100 cc. of blood (extreme limits 1 to 10 mg.). In favorable cases, the fever usually gradually diminished over a period of days or weeks until the body temperature was normal. At the same time there was a reduction of the sedimentation rate, an increase in hemoglobin, a disappearance of tubercle bacilli from the sputum, an improvement in the roentgenological findings, and an increase in appetite. Relapses frequently occurred when treatment was suspended. The best results were obtained in exudative pulmonary tuberculosis, with 24 cases improved, 2 unimproved and 4 deaths. In productive fibrous cases, 9 improved, 7 did not improve and one died. Hilar tuberculosis (3 cases) and pleuritic tuberculosis (9 cases) showed improvement. Of 10 empyema pleurae cases (in some cases treated locally by injection of 5 to 10 per cent solutions of PAS without apparent benefit), 4 improved, 3 did not improve, and 3 died. However, extrapleural postoperative cavities infected with *Mycobacterium tuberculosis* were treated very successfully by filling the whole cavity (usually of limited size) with a solution of PAS which was changed every second or third day. Healing resulted in 4 cases and improvement in 3 cases. Six cases of miliary tuberculosis or tuberculous meningitis terminated fatally despite treatment with PAS. PAS has a low toxicity. Toxic symptoms (seen in a few cases) were: kidney irritation with a slight

albuminaria, diffuse gastrointestinal discomfort and occasionally troublesome diarrhoea.

M McNALLY, P. A. (1947.) **The action of mono-alkyl and dialkyl succinic acids and the mono-esters and mono-amido-derivatives of alkyl succinic acids on the growth of *Mycobacterium tuberculosis*.**—*Brit. J. exp. Path.* 28. 161–167. 1167

Mono and di-alkyl succinic acid half ethyl esters:— $R_1CH(COOH) \cdot CHR_2(COOEt)$ —in which the number of carbon atoms in the summed R_1 and R_2 chains was 13 or 14, were markedly inhibitory towards *Mycobacterium tuberculosis* *in vitro*. Various substituted mono-amido derivatives and esters of other alcohols were equally effective. There was also marked haemolytic activity. The addition of serum albumin reduced the antibacterial and haemolytic effects. *Staphylococcus aureus* and *Corynebacterium diphtheriae* were also inhibited but *Bacterium coli* and *Aerobacter aerogenes* were not. There was evidence that the effect was bactericidal rather than bacteriostatic.

—R. MARSHALL.

DVORNIĆ, D. (1948.) Baktericidno djelovanje Neolohsola. [**Bactericidal action of neolohsol.**]—*Vet. Arhiv.* 13. 117–129. [Abst. from German summary.] 1168

Neolohsol, a mixture of phenols and cresols, was tested as a general antiseptic and found to be unsatisfactory.—K. J. SINCLAIR.

MATTICK, A. T. R., HIRSCH, A., & (note by) BERRIDGE, N. J. (1947.) **Further observations on an inhibitory substance (nisin) from lactic streptococci.**—*Lancet.* 253. 5–8. [Authors' summary copied *verbatim*.] 1169

An antibiotic substance, nisin, isolated from liquid cultures of *Strep. lactis*, is active *in vitro* against many types of pathogenic and other organisms.

A method of semi-large-scale preparation of the substance is described.

Even in the impure state, nisin is effective *in vivo* against infections with *Strep. pyogenes*, *C. septicum*, and type II pneumococcus.

Limitation of spread in experimental tuberculosis in the guinea pig has also been observed.

BOTTORFF, C. A., & KISER, J. S. (1947.) **The use of sulfonamides in the control of pullorum disease.**—*Poult. Sci.* 26. 335–339. 1170

Sulphamerazine and sulphamethazine at levels of 0.75%, 0.50% and 0.25% and sulphadiazine at levels of 1.50%, 1.0% and 0.75% were used mixed in the mash and fed for five days to chicks infected with 500 million *Salmonella pullorum* organisms. Adequate controls were kept. During the five days of treatment the death rate was very low but when treatment ceased the death rate

rapidly rose. The three drugs used at 0.75% level gave approximately equal protection.

The treatment was continued for ten days in a second experiment and each of the three drugs fed at levels of 0.75%, 0.5% and 0.25%. Non-infected birds were also treated to detect possible toxic effects. During the first ten days mortality in the infected controls was 86%. In the treated groups it varied from 6–16% at 0.75% drug level and 14–32% at 0.25% drug level. Again there was an increase in mortality when treatment was discontinued.

The infecting dose was reduced to 5 million organisms to approximate nearer to natural infection and treatment with the three drugs was given for five days. At 0.75% drug level mortality varied from 8–12% and at 0.25% level it was from 12–17%. Most of the deaths again occurred after treatment had ceased. In untreated controls mortality was 64%. There was no evidence of toxicity. It was estimated that treatment caused a reduction in mortality of from 30–56%. 90% of the survivors reacted to the rapid agglutination test for *S. pullorum* at 12 weeks.—D. LUKE.

SALISBURY, G. W., & KNODT, C. B. (1947.) **The effect of sulfanilamide in the diluent upon fertility of bull semen.**—*J. Dairy Sci.* 30. 361–369. 1171

Bacteria are apparently important causes of deterioration of semen. Experiments were consequently carried out to determine the effect on fertility of bull semen of adding sulphanilamide to the egg-yolk—citrate diluent at the level of 300 mg. per 100 ml. "In the first investigation all diluents were made up before the investigation started and no precautions were taken to prevent direct light from falling on the citrate-sulphanilamide diluent during the 26 days which were required to complete the collections." In the next two experiments the sulphonamide-citrate buffer was stored in the dark and there was an increase in fertility from the resultant semen amounting to 6.1% and 4.5% of the cows inseminated.

In the third experiment a more elaborate layout was attempted, involving comparisons between first and second ejaculates, diluted with egg-yolk-citrate buffer, with and without sulphanilamide, and a detailed analysis of covariance was possible. Sulphanilamide appeared to influence all semen samples in the same direction; for no significant interactions were observed between the treatments employed with the semen of various bulls or first and second ejaculates. The results are considered to indicate that the beneficial effects of sulphanilamide on fertility are largely metabolic rather than due to bacterial control alone.

The technical difficulties in preparing suitable buffers containing sulphanilamide and their

storage away from light are discussed and experimental details for preparation are given. No confirmation was obtained of previous reports of the teratogenic effects of sulphonamides brought into contact with certain species in the early stages of their development; the authors were not able to examine every calf produced by the sulphanilamide treated semen, there were no reports of the birth of abnormal calves. The practical value of the results of these studies in routine artificial insemination is discussed.—A. E.

STANLEY, N. F., & MILLS, J. A. (1946.) **The biological activity of a substance resembling gliotoxin produced by a strain of *Aspergillus fumigatus*.**—*Aust. J. exp. Biol. med. Sci.* **24**. 133-137. Discussion pp. 137-138. [Authors' summary slightly amended.] 1172

The authors describe the preparation and the biological and chemical properties of aspergillin, an antibacterial substance produced by *Aspergillus fumigatus*. Evidence, such as melting point, solubility, antibacterial activity, M.L.D. for mice, specific rotation and chemistry of derivatives, is presented, which indicates that aspergillin is similar to, if not identical with, gliotoxin ($C_{13}H_{14}N_2O_4S_2$).

Some idea of the mode of action of aspergillin has been deduced from a study of the nature of aspergillin-resistant organisms and of substances capable of suppressing its antibacterial activity.

PANISSET, M., & LOUIS-MARIE. (1945.) **Contribution à l'étude des substances bactériostatiques présentes dans les plantes à chlorophylle du Québec. 1. Notes préliminaires sur les vinaigrier et célastre, bardane, plantain et salicaire. [The study of bacteriostatic substances present in chlorophyll plants in Quebec. 1. Notes on *Rhus typhina*, *Celastrus scandens*, *Arcium minus*, *Plantago major*.]**—*Rev. d'Oka*. **19**. 1-4. 1173

A diffuse account of some observations on 50 plants to test bacteriostatic effects. The authors report zones of inhibition in the cases of the plants mentioned in the text.

LAUNOY, L., & FLEURY, O. (1941.) **Sur l'élimination et sur l'action trypanocide expérimentale de l'antimoine injecté par voie veineuse à doses réfractées et sous forme de para-amino-phénylstibinate de méthylglucamine. [Excretion and trypanocidal action of antimony intravenously administered in divided doses as p-amino-phenylstibinate methylglucamine.]**—*Bull. Soc. Path. exot.* **34**. 226-238. 1174

Continuing experiments of 1938 [see V. B. 9. 895] on the use of a pentavalent antimony compound, p-amino-phenylstibinate of methylglucamine, on the treatment of rabbits infected with *T. annamense* [= *T. evansi*], the same authors

attempted to ascertain whether repeated small doses caused an accumulation of antimony in the blood, in what organs the antimony accumulated, and whether antimony was eliminated by the intestines. A further note is also given on the curative action of repeated small doses, in view of the experience that a single curative dose may cause death from shock. The details of the technique used in estimating quantities of antimony were given in the previous communication.

The findings were that whatever the dose of the antimony salt injected, and whether it was injected in one dose or in repeated doses, after 24 hours the antimony content of the blood becomes approximately constant, the small residual antimony being then eliminated very slowly. Antimony was found to accumulate in the liver, kidneys, skeletal muscles and the muscles of the digestive tract. As regards excretion 82.6% antimony could be recovered from the urine, and in no case was more than 4.67% recovered from the faeces.

The only promising results obtained by treatment with the curative dose divided into fractions and administered at various intervals were given by half doses injected after an interval of 24-48 hours.—U. F. RICHARDSON.

STEWART, J. S. (1947.) **The treatment of bovine coccidiosis with 4:4'-Diamino diphenyl sulphone.**—*Vet. Rec.* **59**. 21-27. 1175

S. points out that the variety of drugs in use indicates the lack of success which has attended the treatment of bovine coccidiosis. Sulphamethazine has been found active in bovine coccidiosis but it is too costly to be used on a wide scale. In the present paper S. reports that diaminodiphenyl sulphone when given orally once a day is effective in terminating dysentery within 2-3 days and return to normal faeces occurs within the next 24 hours. The oocyst counts were also reduced from levels between 200 to 25,000 per gramme to negligible numbers after 2-3 days. Recommended dosages are at the rate of 0.04 g. per kg. per 24 hours or 0.08 g. per kg. per 48 hours. In both instances the first dose should be double these values. The minimum blood levels of diaminodiphenyl sulphone attained in successfully treated calves were 2-3 mg. per 100 ml. Treatment should last six days, i.e., six doses or three doses according to the method used. *E. zurnii* was the species concerned in these trials and S. found that as a result of treatment this species disappeared before *E. bovis*. It is recommended that all contact cattle should be treated.—C. HORTON SMITH.

STEWART, J. S. (1947.) **Coccidiosis in the dog: dosage of sulphamezathine in relation to its potential use.**—*Vet. Rec.* **59**. 378. 1176

Coccidiosis in dogs caused by *Isospora bigemina*, the oocysts of which may be passed in the faeces in a sporulated condition, is usually diagnosed in kennels where large numbers of dogs are kept. The symptoms associated with the disease are enteritis and emaciation, diarrhoea may occur during the acute stages. Although there is no definite evidence that sulphonamides are active against *Isospora*, S. used sulphamethazine to determine the dosage routine necessary to attain a blood concentration comparable with that effective in *Eimeria* infections. At a dosage rate of 0.05 g. per kilogram body weight twice daily with the first "loading" dose double, a minimum blood level of sulphamethazine of not less than 3 mg. was maintained after the overnight interval between doses. That level is effective against several species of *Eimeria* in ruminants, rodents and birds and by analogy the course of treatment should last for 5-6 days. If the 0.05 g. dosage is ineffective, then 0.1 per kilogram with the first dose double may be used.—C. HORTON SMITH.

HORTON SMITH, C. (1947.) **The treatment of hepatic coccidiosis in rabbits.**—*Vet. J.* 103. 207-213. 1177

Using oocysts of *Eimeria stiedae* sporulated in the laboratory as the infecting agent for young rabbits, the values of sulphamethazine in preventing infection, and of sulphamethazine and sulphapyrazine in controlling infection, were tested by comparing treated rabbits with controls.

Sulphamethazine incorporated in the food in the proportion of 1% gave complete protection when given three days before the administration of 2,000,000 sporulated oocysts, whilst of seven control animals four died and two others showed severe affection.

This preventive treatment was also effective in controlling severe hepatic coccidiosis if postponed up to ten days after the administration of oocysts, but not when postponed for 15 days. In the animals treated 5-10 days after the infecting oocysts, no animals died, and the livers only showed a few scattered lesions. Of the controls, four out of five animals died. In less massive infections 0.5% sulphamethazine or 0.25% sulphapyrazine administered in the same way were also effective in controlling the disease. 0.25% sulphamethazine failed to prevent severe disease of the liver in three out of six animals.

It is claimed that there was some evidence that treated survivors of heavy infections are immune to later infections with the same species of coccidia, and it is suggested that a certain blood concentration of the drug must be reached before coccidiostatic action takes place, and that this level must be attained before the development of the later stages of schizogony.—U. F. RICHARDSON.

CAUJOLLE, F., & CAMOU, R. (1946.) **Le carvacrol dans le traitement des coccidioses du lapin. [Carvacrol in the treatment of rabbit coccidiosis.]—*Rev. Méd. vét., Lyon et Toulouse.* 97. 481-485. 1178**

Daily doses of "carvacrol oil" (5 ml. of 5%) were administered to young rabbits infected with coccidia. The efficiency of the drug was gauged by comparisons of the numbers of oocysts passed before and after treatment. Considerable reduction in numbers or complete disappearance of oocysts were observed after several days' treatment.—C. HORTON SMITH.

GINGRICH, W., SCHOCH, E. W., SCHWAB, M., & SHEPHERD, C. C. (1947.) **Radical cure of avian malaria (*Plasmodium cathemerium*) with SN 8557, a naphthoquinone derivative.**—*Amer. J. trop. Med.* 27. 147-152. 1179

The naphthoquinone derivative SN 8557, when administered in doses of 150 mg. per kilogramme per day for 5, 10 or 15 days, cured 61 of 110 canaries with various types of *P. cathemerium* infections. Seventy-eight % of the birds treated with the drug for 15 days were cured. An exclusively erythrocytic strain was found to be more susceptible to cure than a strain in which both erythrocytic and exoerythrocytic development occur. Susceptibility to cure in latent infections bears a relation to the duration of latency in addition to strain. A 4-5 day treatment begun on the day of inoculation with an exclusively erythrocytic strain is a fair indicator for curative effects in latent infections, whether blood or sporozoite induced, or of a more virulent strain. The duration of immunity to *P. cathemerium* in canaries was not known at the time of reinoculation in these experiments but the susceptibility present at five months after treatment affords evidence for both loss of infection and loss of immunity.

—C. HORTON SMITH.

TRIPATHI, P. C. (1947.) **Sulphonamides in foot and mouth disease of cattle.**—*Indian vet. J.* 23. 467-470. 1180

Forty cases, mild, moderate and severe, were treated with sulphonamides and compared with ten similar cases not so treated. The treatment was partly local; mouth lesions were cleaned with potassium permanganate and a sulphonamide-glycerin paste thoroughly applied twice daily for a few days. Foot lesions were cleaned with copper-sulphate lotion and sloughs removed. After drying with spirit, thiazamide (sulphathiazole) paste was applied, this being repeated twice daily. General treatment consisted of a full dose of sulphanilamide or sulphapyridine thrice daily for two or three days. Observation was maintained, particularly with regard to the period for which

the animal was incapacitated by the attack. For the sulphonamide group this period averaged 8–11 days and it was 20–33 days for the untreated group.—F. C. MINETT.

BLAGOVESHCHENSKIĬ, D. I., & SERDYUKOVA, G. V. (1946.) [The action of chemical substances on pasture ticks.]—*Izv. tadzhik. Fil. Akad. Nauk SSSR*. No. 6. pp. 75–89. [In Russian.] [*Abst. in Rev. appl. Ent. Ser. B.* 35. 76. (1947), copied *verbatim*.] 1181

An account is given of laboratory and field experiments in Tadzhikistan in 1943 in which various substances were tested as repellents for Ixodid ticks that infest cattle. In the laboratory, unfed males and females of *Hyalomma anatolicum anatolicum*, Koch, *H. a. excavatum*, Koch, and *Rhipicephalus turanicus*, Pomerantzev, were confined in small clay squares from which they could escape only by crossing barriers of the substances under test, or in the case of a liquid, strips of impregnated fabric. The results are given in tables and showed that of the 26 substances tested, the only ones that proved more or less effective were liquid carbolic acid, lysol, naphtha-lysol, creolin, tar, mint oil, turpentine, aniseed oil, clove oil, ethyl acetoacetate, coriander oil and a pinene obtained from juniper oil. Pyrethrum powder was not repellent, but killed ticks that came into contact with it. Of diluted preparations commonly applied in practice, the most effective were 10–30 per cent. carbolic acid, lysol, naphtha-lysol or creolin in water. In experiments with *R. turanicus* outdoors, the effectiveness of all substances was reduced.

In tests in which calves were treated with lysol, creolin or naphtha-lysol at concentrations of 5 per cent. in water or vaseline ointment, and confined for up to four hours on plots in which 200–400 unfed adults of *H. a. anatolicum* were released, naphtha-lysol was the only material to give promising results. It apparently repelled and killed the ticks, and was more effective in the ointment than in water. The ticks crawled on to calves dusted with pyrethrum, but of 181 that were collected from them, 111 were moribund. Evidence was obtained in additional experiments with females of *H. marginatum*, Koch, and *H. a. anatolicum* that pyrethrum is toxic to ticks that have not attached themselves to their hosts and to those that have just begun to feed, but has little effect on females that are partly engorged, even after a second application.

VOROB'EVA, A. N., & POKROVSKIĬ, S. A. (1946.) [Test of waste lubricating oil as a means of controlling ticks.]—*Izv. tadzhik. Fil. Akad. Nauk SSSR*. No. 6. pp. 90–91. [In Russian.] [*Abst. in Rev. Appl. Ent. Ser. B.* 35. 75. (1947), copied *verbatim*.] 1182

In further experiments against ticks on cattle in Tadzhikistan, three of six cows that were about equally infested with *Hyalomma detritum*, Schulze, were brushed with used lubricating oil in May 1941. After 24 hours, 203 ticks, all living, were found on the untreated cows and 60 living and 47 dead ones on the treated animals. The presence of so many living ticks on the treated cows was probably due to reinfestation, but the fact that they included five fully and ten partly engorged females showed that some had survived the treatment. In another test in which the predominant tick was *H. anatolicum*, Koch, four cows were freed from ticks by hand and two of them were treated with the oil. The numbers of ticks found 24 hours later were 72 on the treated animals and 118 on the others, so that the oil had little repellent effect.

GIMINGHAM, C. T., & GALLEY, R. A. E. (1947.) DDT insecticides.—*Agric., Lond.* 54. 130–134. 1183

This is a review of the development and application of D.D.T., indicating its merits, and the limitations in its uses. Lists are given of the crop pests in the control of which D.D.T. is effective, ineffective or uncertain.—L. DAVIES.

CHRISTOPHERS, S. R. (1947.) Mosquito repellents, being a report of the work of the mosquito repellent inquiry, Cambridge 1943–4.—*J. Hyg., Camb.* 45. 176–231. [Author's summary and conclusions slightly amended.] 1184

A general survey has been given of the subject of repellents against mosquitoes. Results recorded in published literature prior to the war have been summarized and those from the greatly increased volume of unpublished research during the war briefly outlined. Older results were often conflicting due to many of the substances tested not being pure chemicals but very commonly essential oils and other products having a variable composition and to the methods used in testing being insufficiently precise and standardized. Particularly, standardization was lacking of the mosquitoes used in the tests. The whole treatment of repellency on a scientific basis depends upon the suitability of the methods used in testing and for this reason a full and detailed account has been given of the methods used in the present enquiry in rearing standardized cultures of *Aedes aegypti* and of the methods of laboratory testing and of interpreting results.

Field tests are valuable but less suitable than laboratory tests for determining with precision the properties of repellent substances owing to the impossibility of obtaining controlled conditions.

A description of the chief features of such repellents as have been in use, and the results of

testing a considerable number of compounds and preparations are given, with data showing their comparative repellent power and duration of protection afforded. In this series three types of compound especially exhibit repellency, viz. (1) unsaturated long-chain alcohols, aldehydes and phenolic compounds such as are characteristic of most essential oils, such as oil of citronella; (2) high boiling-point esters of the lower methyl series with various high molecular weight acids, such as phthalic, adipic, cinnamic, citric, etc., of which dimethyl phthalate is the best-known example, and (3) high boiling-point alcohols, especially diols, which need not necessarily be unsaturated or contain methyl series groups, of which Rutger's 612 or 2-ethylhexane 1:3-diol is the best known. There are, however, other groups which for some reason may possess this property.

It is shown that to give protection for a period sufficient to qualify a substance to be considered a repellent, i.e. in the criterion adopted by the Unit a protection period of 2 hr., it must have the relatively high boiling-point of at least 250°C. at 760 mm. pressure. Compounds with lower boiling-point volatilize completely on the warm skin. To give protection for 6 hr. the boiling-point must be at least of the order of 280°C. Substances with boiling-point much over this, whilst they show lasting effect, are apt to exhibit a lower grade of repellency.

The question of rub-resistant creams, of measurement of effect of repellency at a distance, of impregnation of clothing with repellents and of the testing of penetrability of clothing fabrics to mosquito bites are dealt with. The last has been dealt with in some detail since no account of such testing has, so far as is known, been given in the literature. A note by J. R. Whinfield giving technical methods of measuring structural features of fabrics has been given as an appendix.

Work during the war has related almost entirely to the use of repellents for military purposes and the repellent almost universally employed has been dimethyl phthalate. In the American Army the so-called 6:2:2 mixture, i.e. a mixture in the above proportions of dimethyl phthalate, Rutger's 612 and indalone, has been the official repellent. But Rutger's 612 has never been so freely available as dimethyl phthalate and neither it nor indalone has been in extensive use in this country. Dimethyl phthalate has very generally been found most suitably used 'straight' being carried in a suitable receptacle from which a little is shaken out into the palm of the hand and used to anoint exposed skin areas or even clothing. For impregnation of tropical uniforms it has usually been dissolved in a solvent or as an

emulsion and the articles sprayed or dipped and wrung out. It is effective against many forms of biting insects and has been used against mites. For mites it has been to some extent replaced by dibutyl phthalate, which when used for impregnating clothing is more resistant to washing.

EVELIUS, H. R. (1946.) Undersökningar angående DDT — diklordifenyltriklorethan — beträffande dess användbarhet såsom medel mot olika parasiter hos husdjur. [*Trial of D.D.T. against some animal parasites.*]—*Skand. Vet-Tidskr.* 36. 173-187. [Abst. from English summary.] 1185

The effect of different D.D.T. preparations on louse infestation and mange (chorioptic and otodectic) in horses, sheep, dogs, cats, pigs, fowls and turkeys was demonstrated, on a total of about 300 mammals and 1,200 fowls.

After a preliminary toxicity determination on white rats, D.D.T. was tried in a 5% and 10% powder mixed with kaolin and also in 5% solution in soap-spirit-benzene and as 10% solution in soap-spirit-acetone. A sufficiently high D.D.T. concentration must be maintained in the animal's hair or wool for a period equivalent to the hatching time of the parasite eggs.

The solutions must be readily volatile to prevent irritation; spirit-acetone solutions were preferable to spirit-benzene solutions in this respect. Increase of the D.D.T. ratio from 5-10%, in both powder and solution gave more efficient results. Solutions were advantageous to powders. There is no clinical risk of D.D.T. intoxication using these preparations.—E. V. L.

LEAKE, E. W., & BRUCE, W. G. (1947.) *Controlling pests of stock.*—*Yearb. U.S. Dep. Agric.*, 1943-1947. pp. 670-673. 1186

The great advances in the control of serious livestock pests in the U.S.A., through the application of new insecticides is outlined. D.D.T., with its high toxicity and great residual effect has become especially important and an example is given of the highly profitable returns possible by its judicious use. Some limitations in the use of D.D.T. are also mentioned. Benzene hexachloride has shown promise in the control of livestock pests, and has an advantage over D.D.T. in its promising ovicidal effects. Benzyl benzoate used during the late war to protect man against mites, may also become important in protecting livestock from mites.—L. DAVIES.

DESCHIEENS, R. (1945.) Les conditions de l'action anthelminthique de certains sels de métaux alcalins et alcalino-terreux. [*The conditions for anthelmintic action required by certain salts of alkalis and alkaline earths.*]—*Bull. Soc. Path. exot.* 38. 101-104. 1187

The effect upon *Rhabditis macrocerca in vitro* and upon *Aspicularis tetraptera in vivo* of various salts was tested. *In vivo* tests were made by rectal injection into mice.

KCl, NH_4Cl , BaCl_2 , CaCl_2 , KBr, KI, and NaHCO_3 were toxic to the mice in concentrations which were effectively lethal to the parasites. Na_2SO_4 and MgSO_4 were inactive. NaCl in concentration of 45 parts per 1,000 was non-toxic and anthelmintic. This salt could also be effectively used *per os* as a pill for the rabbit.

—R. MARSHALL.

CHAVANCE, J. (1945.) *Théorie histaminique de la fourbure aiguë du cheval : son traitement par les antihistaminiques de synthèse. [Histamine in the causation of laminitis in horses. Treatment of two cases by antergan.]—Bull. Acad. vét. Fr.* 18. 260–266. 1188

C. puts forward a theory that acute laminitis in the horse is primarily a result of local excessive formation of histamine, possibly formed from protein breakdown. General and specific effects of histamine in the animal body are discussed, and the suggestion is made that the classical methods of treating laminitis in the horse, summarized in the text, are in accordance with the histamine-causation theory. Following this C. decided to treat the condition with certain anti-histamine preparations and describes the successful treatment of two acute cases with two synthetic derivatives, antergan and neo-antergan whose systematic nomenclature are given in the text. Interested readers should consult the original for further details.—A. EDEN.

LOEW, E. R., KAISER, M. E., & ANDERSON, M. (1946.) *The anti-histamine action of alkyloxy-triazines and related compounds.—J. Pharmacol.* 86. 7–13. 1189

Several of these compounds were found to be four times as effective as aminophylline in preventing experimental asthma induced in g. pigs with atomized histamine. They are less potent than phenolic ethers (synthesized by Fourneau) or benzhydryl ethers (e.g., benadryl). The therapeutic ratio of the triazines is much higher than that of aminophylline. The triazines prevent spasm of g. pig intestinal muscle in response to histamine, barium and acetyl choline added *in vitro*.—J. M. ROBSON.

ROBINSON, M. (1947.) *Hormonal treatment of deficient lactation. Results with crude anterior-pituitary extract.—Lancet.* 253. 90–92. 1190

In puerperal women with deficient lactation daily injections of crude ox anterior pituitary extract gave no better results than those obtained in controls (injection of saline, massage of breast, or oral administration of proprietary galactagogue).

Pituitary extract together with thyroid (gr. 4 daily by mouth) produced 100% increase in milk output; this was not obtained when hexoestrol was also given and it is possible that hexoestrol counteracts the effect of thyroid.—J. M. ROBSON.

COMMON, R. H., RUTLEDGE, W. A., & BOLTON, W. (1947.) *The influence of gonadal hormones on serum riboflavin and certain other properties of blood and tissues in the domestic fowl.—J. Endocrinol.* 5. 121–130. 1191

Treatment of pullets with oestradiol dipropionate plus testosterone propionate which simulated normal reproductive hypertrophy of the oviduct, comb and wattles also elicited the concomitant increases in serum calcium and various plasma phosphorus fractions. The blood changes, however, were exaggerated as compared with those found as the pullet enters normal reproductive activity. It is suggested that a closer simulation of the normal changes would have required additional hormone treatment, possibly with thyroid. Other effects observed were: a very large increase in serum riboflavin, such as is found in hens coming into lay, a decrease in haematocrit value and an increase in the total blood volume.

—J. M. ROBSON.

DECHAMBRE, L. (1944.) *Les hormones génitales du lobe antérieur de l'hypophyse et hormonothérapie. [Genital hormones of the anterior lobe of the hypophysis and hormone therapy.]—Cah. Méd. vét.* 14. 1–12. 1192

The properties of gonadotropic hormones and their relation to the oestrous cycle and pregnancy are reviewed. Their uses in the treatment of various conditions in the mare, the cow, the sow, the sheep, the bitch and the cat are described. The type of preparation used is not clearly stated and all doses are given in animal units. The bibliography is incomplete.—J. M. ROBSON.

CHARY, R. (1943.) *Notes sur l'emploi de l'adrénaline dans le traitement du tétanos. [Treatment of tetanus with adrenalin.]—Rec. Méd. vét., Alfort.* 119. 8–9. 1193

The course of this disease in a six weeks old foal is described from the occurrence of a foot injury, through the onset of clinical tetanus three weeks later, until symptoms began to abate after three weeks of treatment. Adrenalin was given intravenously in doses up to 3 mg., but usually 2 mg. as the higher dose was the limit of tolerance in an animal of this age.

Antiserum was given in doses of 10,000 units intramuscularly from the 7th to the 21st day after the onset.

It was noticed that the antiserum was most effective in relieving muscular spasm in tissues adjacent to the site of injection.—T. H. FRENCH.

BODANSKY, O., & GUTMANN, H. (1947.) **Treatment of methemoglobinemia.**—*J. Pharmacol.* 90. 46–56. 1194

The minimum lethal level of methaemoglobinaemia, induced by *p*-aminopropiophenone, is reached when 80–85% of the blood pigment consists of methaemoglobin. At high but non-lethal levels, methaemoglobinaemia is reduced much more rapidly by methylene blue than by ascorbic acid or by BAL; methylene blue is highly effective in saving dogs from death at degrees of methaemoglobinaemia which would otherwise be fatal. The minimum lethal level of methaemoglobinaemia in man is similar to that in the dog, and 1–2 mg. methylene blue per kg. is rapidly effective in counteracting the symptoms.

—J. M. ROBSON.

HUGHES, E. S. R. (1947.) **Refrigeration anaesthesia.**—*Brit. med. J.* May 31st. 761–764. 1195

This is a report of 25 cases of refrigeration anaesthesia of a leg for amputation through the thigh, for gangrene, severe injury or neoplasm of the foot or lower leg.

The principle of technique is the chilling of the tissues, so that all metabolic changes cease and this occurs at a temperature slightly above the freezing point of water. Chilling is effected by packing the leg in crushed ice for periods of about three hours or more. The clinical response is the complete cessation of pain or other sensation, so that amputation can be carried out painlessly.

The method is indicated chiefly in poor risk cases, in order to prevent shock at or after operation.

The results of H.'s cases were unfavourable, as death occurred in 12 patients within nine weeks of operation.

[This type of regional anaesthesia appears to have no applicability in veterinary medicine.]

—J. E.

MILLENBRUCK, E. W., & WALLINGA, M. H. (1946.) **A newly developed anesthetic for horses.**—*J. Amer. vet. med. Ass.* 108. 148–151. 1196

The authors, after trying a number of different anaesthetics for horses, none entirely satisfactory, developed one which possesses many advantages. This consists of 1 oz. chloral hydrate, $\frac{1}{2}$ oz. magnesium sulphate and 100 g. pentobarbital sodium dissolved in 1,000 ml. water. Owing to the tendency of chloral hydrate to precipitate the barbiturate the solution should be prepared not more than an hour before use. The recommended procedure for preparation of the anaesthetic is to dissolve the chloral hydrate and magnesium sulphate in 800 ml. water, and then add 200 ml. of a 50% aqueous solution of the barbiturate just

before use. The drug is administered intravenously into the jugular vein by gravity flow.

The excitement stage with this anaesthetic is almost absent and narcosis is reached within about four minutes. The period of surgical anaesthesia is short and complete, lasting from 15–30 min., recovery is rapid and without any after-effects. The toxicity at the level of use indicated appears to be negligible and the range of safety is at least 100% above the average dose. It is claimed that the anaesthetic is reasonably economic and requires no specialized equipment, operating table or harness whilst a limited amount of manpower only is necessary where this newly developed anaesthetic is being employed.—A. EDEN.

DUBIN, I. N. (1945.) **The role of ether anaesthesia in the production of influenza virus pneumonia in mice.**—*J. Immunol.* 51. 355–357. 1197

Influenza virus was inoculated intranasally into two groups of mice, one of which had been anaesthetized with ether and the other with nembutal, intraperitoneally.

The mice were killed with ether on the fourth day and the gross pulmonary consolidation was estimated in terms of percentage of the total lung mass. In the nembutal group the mean value was 54% and in the ether anaesthetized group it was 53%.

The findings indicate that the relative insusceptibility of unanaesthetized animals to intranasal inoculation of influenza virus is due to the fact that such animals fail to aspirate the virus and that the ease with which etherized mice can be infected with influenza virus is due to the ready aspiration of the inoculum rather than to any effect which ether may have on the respiratory mucosa. Unanaesthetized controls were not kept.

—D. LUKE.

DUBÉ, E., DUGAL, L. P., & ROYER, A. (1946.) **Speeding up action of oxalic acid on the process of wound healing.**—*Canad. med. Ass. J.* 54. 103–106. 1198

Clinical experiments confirmed observations on laboratory animals, that weak concentrations of oxalic acid with sulphathiazole accelerated the healing of wounds. In human beings the daily relative gain in surface healed was 39.19%. Most cases studied were skin grafting cases wherein two or three donor areas on the same patient were used.

—J. L. BYRNE.

BELLOWS, J. G. (1946.) **Influence of local antiseptics on regeneration of corneal epithelium in rabbits.**—*Arch. Ophthalmol.* 36. 70–81. [Abst. in *Brit. Abstr. Sect. A* 3. Dec. 1015. (1946), copied *verbatim*.] 1199

Ag protein, ZnSO₄, herbromin, phemerol

chloride, Hg oxycyanide, methaphen, merthiolate, acriflavine, penicillin, and Na sulphathiazole were tested. While untreated eyes appeared clinically normal, most of those treated had denuded areas. Penicillin and sulphathiazole, neither of which had any delaying action on regeneration and did not cause corneal opacity, were exceptions. The histological appearances were similar in all cases, suggesting that the changes are not dependent on the chemical nature of the antiseptic.

KRUSÉ, C. W., & METCALF, R. L. (1946.) **An analysis of the design and performance of airplane exhaust generators for the production of DDT aerosols for the control of *Anopheles quadrimaculatus*.**—*Publ. Hlth Rep., Wash.* 61. 1171–1184. 1200

The aeroplane aerosol-generating unit described and figured consists of apparatus for the introduction into the plane's exhaust-gas stream, of concentrated D.D.T. solution, through atomizing nozzles opening into a venturi introduced into the structure of the exhaust-pipe. The factors determining the particle size of the D.D.T. aerosol produced have been analysed and formulated for practical application to the design of the

See also absts. 1034 (penicillin and mastitis); 1051 (penicillin and swine erysipelas).

equipment. The characteristics of aerosol distribution with regard to swathe width, penetration of vegetation and minimum dosage for larvicidal effectiveness have been analysed and formulated for field use. These results indicate that aerosols having a mass median diameter between 25 and 50 microns are best suited for the control of *A. quadrimaculatus* larvae under conditions encountered on impounded waters.

—L. DAVIES.

LATTA, R., & GOODHUE, L. D. (1947.) **Aerosols for insects.**—*Yearb. U.S. Dep. Agric., 1943–1947.* pp. 623–627. 1201

Aerosols of liquid particles, usually less than 50 microns in diameter have been found to give best results and are particularly effective against flying insects. Some of the principles governing the uses and production of aerosols are given. In the U.S.A. the method used for generating aerosols is that of confining under pressure a liquefied gas containing an insecticide, its solvent and some non-volatile material. The insecticidal mist is formed on releasing the gas through a valve and nozzle. Some of the insecticides and the formulae used in aerosols are mentioned.—L. DAVIES.

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

HADDOW, A., & RUDALL, K. M. (1945.) **Artificial coat coloration and the growth of hair.**—*Endeavour.* 4. 141–147. 1202

When 20–30 mg. of 9-phenyl-5:6-benzo-iso-alloxazine was injected intraperitoneally into albino rats, bilaterally symmetrical areas of orange yellow pigmentation of the coat were produced. The patterns obtained from many rats were of a characteristic type, the coloration being restricted to certain areas, but with variation in detail from one rat to another. If a second injection was given after an interval of a few days, a second zone of pigmentation was obtained.

Untreated rats were shorn over the back and sides, and the regeneration of the coat was studied. This regeneration did not occur diffusely, but began peripherally and proceeded centripetally. The pattern of the growth-wave-front was similar to that obtained by injection of the dye. The patterns obtained with the dye were similar for shorn and normal rats, indicating that normal replacement of hair follows this pattern cyclically, each cycle taking about 35 days.

The dye was effective by oral administration, and was transmitted *via* the milk to offspring. The coloration of the coat of the newborn developed diffusely. Histologically, the dye was shown to be concentrated in the cortex of regenerating hairs. The pigment was obtained from hair by heating

with acetic acid, and extraction with chloroform. It was then separated by chromatography, and shown by ultraviolet absorption spectroscopy to be the original dye or a simple derivative. Pigmented hair contained 0.01% of the dyestuff.

Intravenous administration of chlorazol sky-blue, followed by killing the animal and examining the underside of the pelt, enabled the vascularity of the skin to be plotted. Bands of high vascularity corresponded exactly with zones of active hair regeneration as revealed by coincident pigment treatment.

The rate of excretion of these drugs in the faeces and urine was directly related to their penetration into the hair.

There are 12 colour illustrations.—R. J. F. ROUGIER, G. (1947.) **Sur les effets des fortes concentrations en gaz carbonique chez différents animaux. [The effects of high concentrations of CO₂ on animals.]**—*C.R. Soc. Biol. Paris.* 141. 78–79. 1203

The effects are described in rats, rabbits, g. pigs, hens and pigeons. These birds are more sensitive to the action of CO₂ than mammals and the hen shows symptoms with concentrations as low as 15%. Hyperpnoea leads to loss of consciousness with full muscular relaxation. With 50% CO₂ the animal becomes comatose almost immediately.—J. M. ROBSON.

MINETT, F. C., & SEN, S. (1945.) **Rectal temperatures of certain animals at rest.**—*Indian J. vet. Sci.* 15. 62-78. 1204

Records were taken at Izatnagar (United Provinces) of daily body temperatures (minimum, maximum, mean) of water buffaloes, zebu cows, sheep, goats and fowls, at different times of the day and in different months. The range of air temperature and the number of observations were also noted. The results are summarized.

In a male buffalo during June, July, August and December, when the air temperature range was 81°-108°F., 80°-106°F., 73°-102°F. and 49°-80°F., the mean daily body temperature was 100.9°F., 100.9°F., 100.6°F. and 99.7°F. respectively.

In a cow (Hariana) during June, July, August and December when the air temperature range was 81°-106°F., 81°-105°F., 73°-102°F., and 48°-78°F., the mean daily body temperature was 101.4°F., 101.3°F., 101°F. and 101.1°F. respectively.

In a sheep during February and June when the air temperature range was 48°-74°F. and 80°-109°F., the mean daily body temperature was 102.4°F. and 103.7°F. respectively.

In a goat the corresponding figures were 102.7°F. and 104.8°F. respectively.

In a fowl, male, during February and May, the mean daily body temperature was 106.5°F. and 107.5°F. respectively.

A frequency distribution table is shown for 744 observations on 38 buffaloes during 20 days in August, air temperature 79-86°F.

Hourly observation, during 24 hours, on hill-bulls and sheep revealed that the body temperature starts to rise about 6 a.m., follows an upward trend till early evening and then gradually falls to a minimum value at about 1-4 a.m.

In cattle and buffaloes, sheep and goats the body temperature level is influenced by the atmospheric temperature, variations in the latter being followed by similar variations of body temperature. The diurnal level therefore tends to be higher after 1 p.m. than before that time, the difference being far greater with buffaloes, sheep and goats than with cattle.

In temperature-taking, the personal factor is important. Without special instruction differences around 1.0°F. may be registered by different observers. The thermometer should be inserted as far as possible and left in position for one minute.

Following defaecation, the rectal temperature was lowered by 0.3°F. (mean) at 43 out of 51 trials.—S. SEN.

UKRAINCZYK-LABORIE, F., & LABORIE, R. (1945.) **La cholestérolémie dans l'eczéma, chez le chien.**

[**Cholesterolaemia in canine eczema.**—*Rev. Med. vét., Lyon et Toulouse.* 96. 69-81. 1205

In a study on eczema in 32 dogs there was an increase in the blood-level of cholesterol in 94% of the cases. A diet rich in carbohydrate and poor in fat reduced the titre of cholesterol and at the same time an improvement in the eczematous condition was noted.—S. BRIAN KENDALL.

BOLLIGER, A., & HARDY, M. H. (1945.) **The presence of large amounts of uric acid in the integument of mammals.**—*Aust. J. exp. Biol. med. Sci.* 23. 99-102. 1206

Considerable quantities of uric acid were found in the integument of the opossum, sheep and rabbit. When extracted from the surface of two freshly killed rabbits it was obtained in crystalline form and was identified by elementary analysis (C, 35.75; H, 2.47; N, 32.8), by colorimetric and enzymatic methods. Quantitative determinations, both colorimetric and gravimetric, were carried out on skin and hair. These were as follows in mg. %:—rabbit hair, 370-540, wool 80-116, opossum hair 100, rabbit skin 25 and sheep skin 10.—W. K. WHITTEN.

CORAZZI, G. (1946.) **Ricerche sui complessi lipoproteici del siero di giovani zebù in "stato di malattia" (peste bovina). [Lipoprotein complexes in the sera of young zebus with rinderpest.]**—*Boll. Soc. ital. Med. Igiene trop.* 6. 33-41. [English summary.] 1207

In this series of experiments the blood sera of nine zebu cattle, from 18-24 months old, were examined. Two examinations were made on each animal, the first when the animal was normal, and the second on one of the nine days following the onset of a thermal reaction induced by infection with blood from a case of rinderpest in the septicaemic phase, i.e., one animal represented each day of the course of infection.

The changes noted were diminution in the extractibility of lipoids on the second and third days, increase on the fourth day and decrease in the latter stages of the disease. Lability of the lipo-protein complex was increased on the first, seventh and eighth days, decreased on the second day, and normal on the remaining days.

The concentration of alcohol necessary to solidify the sera varied from day to day. With one exception (the eighth day serum) the concentration required for solidification was higher than that concentration which gave the maximum extraction of lipoids.—I. W. JENNINGS.

LIÈGEOIS, F., & DERIVAUX, J. (1946.) **Variations des éléments du métabolisme phospho-calcique au cours de l'urémie d'origine rénale chez le chien. [Phosphorus and calcium metabolism**

in uraemia in the dog.]—C.R. Soc. Biol. Paris. 140. 553-556. 1208

Dogs with uraemia were examined for changes in their phosphorus and calcium metabolism. There was a marked hyperphosphataemia which can be explained by the failure of the kidneys to concentrate phosphates. In some cases the blood calcium level was low. The phosphatase activity of serum varied greatly and was low in a few cases.

—E. KODICEK.

HOLMES, A. D., SPELMAN, A. F., SMITH, C. T., & KUZMESKI, J. W. (1947.) **Composition of mares' milk as compared with that of other species.**—*J. Dairy Sci.* 30. 385-395. 1209

Analysis for water, protein, ascorbic acid, Ca, Mg, P and K contents were made on 26 samples of milk produced by one Palomino and four Percheron mares. The samples were taken in the early lactation period during late winter and early spring when the diet of the mares consisted principally of hay and grain. The milk of the Palomino mare contained more protein, P, K, and Mg than that of the Percherons. Average values for the milk of the Percheron mares, expressed on a 100 g. basis, were water 89.7 g.; protein (N \times 6.38) 2.3 g.; reduced ascorbic acid 8.9 mg. (per 100 ml.); P 63 mg.; K 64 mg.; Mg 9 mg. and Ca 102 mg. Comparison is made with standard figures for the milk of several other species of domestic animals. It is suggested that the Ca : P ratio is considerably higher in mare's milk than in that of cows or goats but is possibly lower than that for human milk.—A. EDEN.

LAMBERT, N. H. (1947.) **Cardiac disease in dogs and cats treated with vitamin E.**—*Vet. Rec.* 59. 355-356. 1210

Six cases of heart disease in dogs and cats diagnosed as endocarditis, were treated by ephynal (*dl*-alpha tocopheryl acetate), dosage being 10-20 mg. per day for 2-3 weeks administered perorally. In all cases an improvement was reported.

—E. KODICEK.

BASU, P. N., & SEN, S. N. (1947.) **Efficacy of protein hydrolysate in the restoration serum protein in hyperimmunized horses after blood depletion.**—*J. Hyg., Camb.* 45. 56-58. [Authors' summary copied *verbatim*.] 1211

Treatment with enzymic hydrolysate of protein after blood depletion has a significant action in restoring serum protein content. Blood depletion of hyperimmunized horses alters the serum globulin fraction much more markedly than the serum albumin fraction.

GERMAN, V. A. (1939.) **Sposob polucheniya syvorotki loshadei grupp A i B iz syvorotki gruppy O.** [Method of obtaining equine blood serum of groups A and B by means of group O

serum.]—*Sborn. Trud. Kharkov. vet. Inst.* 18. No. 1. 49-50. [French summary.] 1212

The isoagglutinin titres of horse blood tend to be rather low, especially in Group B, but sera of Groups A and B with fairly high titres may be obtained by the simple method of adsorbing the appropriate α or β agglutinin out of Group O serum. The technique is to saturate Group O serum with, say, Group A horse red cells. (The quantities used by the author were 1 ml. serum and 2 ml. of centrifuged horse red cells in physiological saline.) The serum-red cell mixture is placed in the refrigerator (0-5°C.) for 24 hours, by which time the agglutinins have been adsorbed. This leaves only agglutinin β in the serum, which will therefore have been transformed to a Group A serum. Group B serum is prepared similarly by saturating Group O serum with Group B horse red cells.—I. W. JENNINGS.

GERMAN, V. A. (1939.) **Gruppy krovi loshadei i sposob ikh opredeleniya.** [Blood groups in horses and their determination.]—*Sborn. Trud. Kharkov. vet. Inst.* 18. No. 1. 17-34. [French summary.] 1213

To define horse blood groups G. examined blood samples from 18 horses by the slide agglutination test, confirming this where necessary by the test-tube method. The serum of each was tested with the R.B.C. of the remaining 17. The samples fell into four main blood groups and one subsidiary group.

The four main groups of R.B.C. identified in this way were compared with human erythrocytes of groups O, A, B and AB, using horse sera from which the species agglutinins had been removed by adsorption with human red cells of various groups. Complementary tests were undertaken with human serum and horse red cells.

Further tests showed that extracts of liver, spleen, kidney and heart may be used in the same way as serum to determine the blood grouping of a given horse.

The following conclusions were drawn:—Horse blood samples may be divided into four main groups corresponding with the four main groups in man, and one other, as yet ill-defined, group.

The percentage incidence in a group of 910 Ukrainian riding horses was:—Group O 10%, Group A 41%, Group B 16%, Group AB 28%. The remaining 5% of animals were blood relations of horses in Group A. Blood agglutinins and agglutinogens are analogous in horses and man—a most important point. Horse sera may be grouped by means of standard human erythrocytes after removal from the former of species agglutinins by Group O human red cells. Similarly horse red cells may be defined by means of

standard human sera, from which species agglutinins have been removed by Group O horse red cells.

Using the three standard horse sera, O, A and B, it is possible to define the blood group of most horses. This may be recorded on the animal's identification papers, or on the ears by tattooing.—I. W. JENNINGS.

KING, E. J., & GILCHRIST, M. (1947.) **Determination of haemoglobin. I. Determination by a cyan-haematin method.**—*Lancet*. 253. 201-205. 1214

The substantial similarity of the spectral characteristics of the cyan-haematins produced with sodium cyanide from haemin and from haemoglobin made it possible to estimate haemoglobin colorimetrically using cyan-haematin prepared from crystalline haemin as a standard. The colours obtained in both cases were directly proportional to the iron contents of the samples. The standards were stable for work of great accuracy for three months and for less precise work were trustworthy for 18 months.—R. MARSHALL.

TEERI, A. E., KEENER, H. A., & MORROW, K. S. (1946.) **Studies on the chemical composition of calf blood.**—*J. Dairy Sci.* 29. 663-667. 1215

The values for certain blood constituents were followed from birth to 23 weeks of age in a group of 24 Guernsey, Jersey and Holstein calves fed whole milk in limited amounts for 6-8 weeks and a dry calf ration with mixed hay as soon as they would consume it; the animals were apparently normal in all respects.

Average values are given, with the range of highest and lowest figures obtained, and have been divided into four age groups, *viz.*, from birth to four weeks, 5-8 weeks, 9-14 weeks and 15-23 weeks.

Plasma carotene values were considerably lower in the Holstein calves than in the Jerseys and Guernseys but in all breeds the average values increased only slightly (26.9 to 36.0 $\mu\text{g.}$ per 100 ml.) and in some cases decreased (32.8 to 20.2 $\mu\text{g.}$) during the first eight weeks and then steadily increased (to 44.0 mg. for the Holsteins and to 64.5 $\mu\text{g.}$ for the other two breeds) as hay consumption increased.

Ascorbic acid values showed no correlation with age or breed and remained constant at an average of 0.43 mg. per 100 ml. plasma although wide individual variations were observed.

Ca and inorganic P did not vary with age and agree with those reported in the literature for animals of similar ages; Ca values ranged from 9.7 to 13.0 with an average of 11.46 mg. per 100 ml. and inorganic P from 4.5 to 8.5 with an average of 6.31 mg. %. Blood glucose values showed a

definite decrease with increase of age from an average of 110.0 at four weeks to 74.2 mg. per 100 ml. at 23 weeks. Cholesterol values paralleled those for glucose being highest (130 mg. per 100 ml.) in the youngest age group and decreasing to 108.8 mg. % for the oldest age group. Non-protein nitrogen and nicotinic acid values remained fairly constant with averages of 29.9 mg. and 0.81 mg. per 100 ml. respectively.—R. ALLCROFT.

KUDRYAVTSEV, A. A. (1944.) **Gemogramma loshadi (diferentsial'naya tablitsa kletok beloï krovî).** [**The Haemogram in the horse.**]—*Veterinariya, Moscow* No 1. pp. 29-32. 1216

K. states that haematological investigations are of special interest for differential diagnosis of infectious anaemia of horses and illnesses characterized by anaemia. For this reason haemograms for farm animals were worked out. A table of results is given which includes figures for the blood of healthy horses.

As the leucocytes of different types are distributed unevenly over the specimens, a systematic method of examination is essential to obtain comparable results. Consequently four typical regions of each specimen are examined. Twenty-five or 50 leucocytes are counted in each region, so that in all 100 or 200 corpuscles are examined. The number of each of the different types is then counted and results given as percentages.—S. W. SALTER.

YAKUSHEV, V. I. (1940.) **Sosudistaya reaktsiya pri okhlazhdenii organizma. [Vascular reaction of an organism to cooling.]**—*Veterinariya, Moscow*. No. 3. pp. 98-100. [French summary.] 1217

By immersing rabbits in water at 1-3°C. the author established that blood pressure rises rapidly at the moment of immersion and begins to fall 15-30 min. later as a result of the weakening of the cardiac action. To eliminate other possible causes of the rise of blood pressure the vagus nerve was cut in the one series of experiments; in others the suprarenal glands were extirpated and in others the spinal cord was cut between the second and third vertebrae. Y. states that the rise of blood pressure referred to above was not due to the discharge of adrenalin into the blood stream and that it was partly of reflex origin and partly due to changes in the actual composition of the blood. Exposure to cold increases the tone of the sympathetic and parasympathetic nervous systems.—E. CHERKESI.

HOLLANDER, F., SONNENBLICK, B. P., & SOBER, H. A. (1947.) **Experimental impairment of the gastric mucous barrier in dogs.**—*J. nat. Cancer Inst.* 7. 361-364. 1218

Mucus production was stimulated by repeated applications of a 5% eugenol-water emulsion on the mucous membrane of a Heidenhain pouch in a dog and physico-chemical and cytological examinations were carried out. The repeated stimulation destroyed the mucous barrier, *i.e.*, the glandular cells and the mucous secretion and resulted in a considerable inflammatory reaction.

The future application of this work with reference to experimental carcinogenesis of the glandular stomach is then discussed.—A. R. J.

FRANTZ, V. K. (1946.) **New absorbable haemostatic agents.**—*Bull. N.Y. Acad. Med.* 22. 102-110. 1219

This is a brief account of the development and properties of three absorbable haemostatic agents, all recommended for use by the U.S. Armed Forces before the end of the war, and since shown to be useful in the control of haemorrhage not easily dealt with by the usual techniques. The first two are "foams"—one, a human fibrin foam, the other a denatured gelatin sponge ("Gelfoam")—which are used as non-irritant absorbable carriers of thrombin, in which they are soaked before application. Although human thrombin is used, bovine thrombin has been used in a large series of human cases, sometimes more than once in the same patient, without untoward effects.

The third agent mentioned is "oxidized cellulose" which is used dry (without thrombin) in the form of gauze or cotton and is easier to handle than the "foams". It is readily made available as an emergency dressing simply by opening the package in which it has been sterilized. This oxidized cellulose turns black in contact with blood, and a sticky gelatinous mass fills the wound space; the pack can be removed if necessary without fear of secondary haemorrhage. No evidence has been obtained that any of these three agents has any adverse local or general sequelae.

—E. COTCHIN.

STUPARIÉ, D. (1948.) **Acetalfosfatidi u nuzbubrezima peradi. [Acetalphosphatides in the adrenal glands of geese, ducks, fowls and turkeys.]**—*Vet. Arhiv.* 13. 164-169. [Abst. from German summary.] 1220

Results of examinations of the adrenals of geese and ducks indicate a greater content of acetal phosphatides in the cells of the adrenal cortex than in the cells of the medulla, whereas in hens and turkeys the reverse is the case.—K. J. S.

I. HEDENSTEDT, S., & NAESLUND, J. (1946.) **Investigations of the permeability of the placenta with the help of ellipocytes.**—*Acta med. scand.* Suppl. No. 170. 126-134. [In English.] 1221

II. NAESLUND, J., & NYLIN, G. (1946.) **Investigations on the permeability of the placenta with the aid of red blood corpuscles tagged with radio-active phosphorus.**—*Ibid.* Suppl. No. 170. 390-398. [In English.] 1222

I. Just before delivery, each of two pregnant women was given a transfusion of blood containing ovalocytes. No increased number of ovalocytes was found after birth in the child of the first woman, who had been normal during pregnancy and expelled a normal placenta. There was an increased ovalocyte count in the child of the second woman, who had shown symptoms of nephrosis during this and a previous pregnancy, and had expelled a placenta showing numerous infarcts and haemorrhages.

II. Red blood cells from the mother were tagged with radioactive phosphorus and re-injected into six pregnant women just before parturition. In five cases, no labelled red cells could be detected in the blood of the child, but in one case, estimations of the radioactivity of the whole blood, plasma, and blood cells of the mother and child indicated that labelled red cells had passed through the placenta into the foetal circulation.—E. COTCHIN.

POPJÁK, G. (1946.) **Maternal and foetal tissue—and plasma-lipids in normal and cholesterol-fed rabbits.**—*J. Physiol.* 105. 236-254. 1223

Feeding of cholesterol to pregnant rabbits during the last three weeks of gestation caused a heavy storage of free and esterified cholesterol and an increase of neutral fat content in the foetal placenta. Histological data suggests that there is also an increase of neutral fats in the decidual cells of the maternal placenta. The lipid storage in the placenta interfered with the nutrition of the foetus, resulting in foetuses one-third lighter than normal. These foetuses contained less neutral fat than the controls. It is suggested that not all foetal fat is derived from preformed maternal fat but that part of it is synthesized within the foetus. The lower neutral fat content of the experimental foetuses was previously brought about by the partial blockage of the placenta to the transfer of the fat precursors. The concentration of lipoids was much higher in the foetal than in the maternal plasma and lipaemia in the mother had little effect on the foetal plasma lipid. The rabbit develops a marked lipopenia by the end of gestation. Although rabbits usually responded to cholesterol feeding with a marked lipaemia in the middle of gestation, this was not the case by the 28th day. When a cholesterol fed animal miscarried, there was an immediate rise in plasma lipoids.

—J. M. ROBSON.

HISAW, F. L. (1947.) **Development of the**

Graafian follicle and ovulation.—*Physiol. Rev.* 27. 95–119. 1224

The development of a Graafian follicle can be divided into four stages (1) oogenesis, organization of the granulosa and theca interna, and growth up to the formation of the follicular antrum. The growth processes in this stage are probably regulated by a self contained system of organizers. (2) This begins when the follicle can respond to pituitary gonadotropin. There is rapid growth, mitotic activity in the theca interna and granulosa and multiplication of follicular blood vessels. (3) This is introduced by a rapid decrease in mitotic rate. The blood vessels continue to increase and reach full development in the fourth stage. (4) This includes pre-ovulatory enlargement of the follicle and ovulation.

It is suggested that pre-ovulatory enlargement and rupture of the follicle are produced by the joint action of (FSH) follicle stimulating hormone and (LH) luteinizing hormone and that neither FSH nor LH acting alone can cause ovulation. Ovulation is initiated by an increase in the secretion of gonadotropin by the pituitary. This increase is caused, in species that ovulate spontaneously, by the action of oestrogen and possibly by progesterone on the pituitary, and probably by nervous stimulation of the pituitary in those species that require mating for ovulation.

—J. M. ROBSON.

DURBEUIL, G. (1941.) Follicules plissés et hyperplasiés de l'ovaire féminin. [**Classification of ovarian cysts.**]—*C.R. Soc. Biol. Paris.* 135. 585–587. 1225

The so-called microcystic follicles in human ovaries should be considered as normal structures. Only a few follicles which will ovulate are present at a time; the other more numerous follicular structures include, beside the ordinary atretic follicles, those which show some degeneration of the germinal and internal thecal components.

Structures regarded as truly cystic are divided into two classes, simple and hyperplastic, according to the degree of proliferation of the granulosa.—T. H. FRENCH.

VOLOSKOV, P. A., & SHILOVA, N. G. (1940.) Vliyaniye organicheskikh i neorganicheskikh kislot na zhiznedeyatel'nost' i zhiznesposobnost' spermatozoidov. [**Influence of organic and inorganic acids on spermatozoal activity.**]—*Veterinariya, Moscow.* No. 3. pp. 95–97. [French summary.] 1226

Tests were carried out with g. pigs, dogs and rams to study the effect on the activity of the spermatozoa of organic (lactic and oxalic) and inorganic (hydrochloric and sulphuric) acids of normality ranging from 0.005 to 0.00001.

The authors conclude that the influence of an acid does not depend upon whether it is organic or inorganic. At equal concentrations and equal pH this influence follows Loeb's rule of valency.

Resistance of the spermatozoa to given acid conditions depends on the species of animal and on the frequency of ejaculation.—S. W. SALTER.

VOLOSKOVA, A. P. (1940.) Lipoidnyĭ sostov spermy domashnikh zhivotnykh. [**The lipid content of the spermatozoa of domestic animals.**]—*Veterinariya, Moscow.* No. 3. pp. 91–94. [French summary.] 1227

Ejaculations were induced artificially in dogs, bulls, and stallions at varying intervals and the semen examined with particular attention to lipid content.

The presence of cholesterol and lecithin was established, the lecithin occurring both in the spermatozoa and the seminal plasma, the cholesterol exclusively in the spermatozoa. The quantity of cholesterol in the ejaculation provides an indication of the saturation of the semen with spermatozoa.

With increased sexual activity the content of lipoids diminishes. To re-establish the content an interval of 3–6 days is necessary. A more extended interval again produces a lowering of the lipid content. With moderate sexual activity the spermatozoa survive longest if the percentage of lipid phosphorus as compared with total cholesterol equals unity. With increased sexual activity there is a tendency to increase of pathological forms of the spermatozoa; at the same time the life of the spermatozoa decreases.

With short intervals between ejaculation each subsequent ejaculation is less in volume than the first. With systematically increased activity there is increased working of the accessory glands, as a result of which there is a marked dilution of the sperm.—S. W. SALTER.

SLIJPER, E. J. (1946.) Over de wervelkolom van onze huisdieren. [**The spinal column of the domestic animals.**]—*Tijdschr. Diergeneesk.* 71. 677–687. [English summary.] 1228

This contribution originates from the Veterinary Anatomical Institute of the State University at Utrecht.

S. states that none of the old or present-day textbooks dealing with the anatomy of domesticated and other mammals offer explanations for the differences in length and direction of the spinous processes of the vertebral column that occur. He refers to the generally accepted old theory of Zschokke that the build and function of the vertebral column can be compared with that of a transverse beam resting on two perpendicular pillars. According to him the vertebral column

and the pelvis constitute the elastic portion of a bow, bent dorsally by a string formed by the sternum, abdominal muscles and the linea alba. He shows how the direction of the spinous processes and other anatomical peculiarities of the different components of the vertebral column in the various species of domestic mammals are

See also absts. 1160 (action of penicillin on uterine muscle); 1243 (textbook of biochemistry); 1244 (review of biochemistry); 1245 (dynamic aspects of biochemistry); 1247 (clinical biochemistry).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

HEMPLER, P. (1940.) **A comparison of some methods of bacteriological grading of milk.**—*K. VetHøjsk. Aarsskr.* 1940. pp. 1-79. [In English.] 1229

The laboratory assessment of the bacteriological purity of milk has been somewhat neglected by the Danish authorities, so various tests were compared for raw and heat-treated milks.

The plate count was tested using six media, incubated at 32°C. and 37°C. for 24, 48, and 72 hours. Regardless of incubation temperature and time, trypsin agar with 1% whole milk and 0.5% lactose gave the largest average number of colonies per plate. Incubation at 32°C. regularly gave higher results than 37°C. The largest number of colonies was obtained by 72 hours' incubation, but a period of 48 hours was considered best, as fewer plates had to be rejected through swarming.

Wilson's modified reduction test gave a shorter reduction time and less variable results than the Barthel and Orla-Jensen test. There was also more agreement with the plate count. Azurufin (a resazurin preparation) did not distinguish with certainty between milk of moderate and high quality.

The direct microscopic count is the quickest method and is useful for picking out samples of poor quality. It cannot be employed with pasteurised milk.—J. O. L. KING.

WORDEN, A. N. (1946.) **Animal health with particular reference to milk production.**—*Dairy Industr.* 11. 572-580. 1230

With dairy cattle the aim is to breed animals which can be kept healthy and which will give optimal—not maximal—quantitative and qualitative milk yields. Milk recording provides the only effective basis for a breeding policy, but the records are profoundly influenced by management. Correction factors so far prepared are not satisfactory. Considering the daily fluctuations in butterfat percentages, tests carried out not fewer than four times during a lactation do not provide even an approximation of the truth. The recording of other desirable constituents is virtually non-existent.

The licensing of dairy bulls on type and con-

influenced by the traction exerted on them by various muscles associated with the manner of progression peculiar to the different species.

His deductions are based on the examination of the vertebral columns of 80 different species of mammals and on that of a goat born without front legs.—P. L. LE ROUX.

formation can only slowly effect improvement. Artificial insemination is of value in controlling venereal diseases, but its value in other aspects of livestock improvement remains to be determined. Much more rapid results will follow from improving the nutrition of cows than from any breeding policy, and the higher cattle are graded up the higher will be their nutritional requirements. It is widely held that in the individual animal high production increases susceptibility to disease, but whether high productive capacity is correlated with lowered disease resistance remains to be determined.

The keynote of all improvement is good husbandry, and too much must not be expected from lucky short cuts in breeding.—J. O. L. KING.

GAUDUCHEAU, A. (1943.) **Utilité prophylactique de la salaison interne des viandes, particulièrement dans les pays tropicaux.** [Prophylactic action of the salting of meat, particularly in tropical countries.]—*Bull. Soc. Path. exot.* 36. 197-202. 1231

With incomplete bleeding of slaughtered animals putrefaction is rapid. S. advises that, especially in tropical countries, a brine solution be injected into the iliac or femoral artery and that this procedure be supplemented by immersion of the pieces of meat in a brine solution.—P. S. G.

CARNUS. (1945.) **Le service vétérinaire dans la guerre et dans la paix.** [The French veterinary services in war and peace.]—*Encyclopéd. vét. périod.* 2. 501-507. 1232

The Veterinary Service during the war operated in Africa, Italy, France and Germany.

In Africa, and later in Italy, animals were in constant use for transport of men and materials. From 1940-1942 the Veterinary Service was based in Algeria, with 10,000-12,000 animals in its care. Mange was overcome by the use of sulphuration chambers; and 20,000 animals left behind by the Germans recuperated under veterinary care.

A brief résumé is given of the history of development of veterinary services in the colonial territories such as Madagascar, Guinea, the Levant, Morocco, Algeria and Tunisia.—P. S. G.

See also absts. 1045 (TB. eradication); 1054 (salmonellosis and duck eggs); 1248 (milk products).

REPRODUCTION AND REPRODUCTIVE DISORDERS

DAVEY, J. F., & DALEY, D. E. (1945.) **A critical survey of two diagnostic pregnancy tests. (Colostrum intracutaneous test and histidine test.)—*Canad. Med. Ass. J.* 52. 371-376. 1233**

The authors feel that high false positive (43%) reactions in the intracutaneous test and false negative results in the histidine test rendered both unsatisfactory as a means of detecting cases of pregnancy.—J. L. BYRNE.

HULL, F. E. (1945.) **Pregnancy disease of ewes. Causes, symptoms, treatment and prevention.—*Circ. Ky. agric. Exp. Sta.* No. 57. pp. 7. 1234**

Pregnancy disease is discussed in non-technical language. Parasitic infestation, with or without deficiency of food intake is considered to be one of the causes. The disease does not seem to be clearly differentiated from hypocalcaemia, as calcium gluconate, given intravenously, is suggested as a rational treatment.

Precise recommendations for winter feeding add to the value of the section on prevention. In stressing the importance of maintaining rising condition during the late stage of pregnancy the author considers that overfeeding during the early stage may actually contribute to the causation of the disease.—T. H. FRENCH.

KAR, A. B. (1947.) **Responses of the oviduct of immature female fowl to injection of diethylstilbestrol and the mechanism of perforation of the oviduct in the domestic fowl.—*Poult. Sci.* 26. 352-363. 1235**

Turkey poults grew poorly when fed on a diet composed of natural ingredients containing no materials rich in riboflavin, developed severe dermatitis, a high incidence of perosis and were poorly feathered. Addition to the diet of crystalline riboflavin, or fermentation riboflavin concentrate or dehydrated alfalfa largely prevented these symptoms; in some experiments biotin was needed in addition to riboflavin for the prevention of perosis. Riboflavin was still effective when 1% ambamide (a sulphonamide which inhibits bacterial growth in the intestine) was added to the diet, this suggested that riboflavin does not produce its effect by causing the bacterial synthesis in the intestinal tract of some other essential factor.—J. M. ROBSON.

HIDDEMA, W. (1946.) **Verzamelreferaat. [Notes on goats, horns, beards etc.]—*Tijdschr. Diergeneesk.* 71. 808-816. [Abst. from English summary.] 1236**

A short account of the genetics of the goat. Hornlessness is dominant to horns except in Angora goats where the reverse is the case. Wattles are dominant to no-wattles. Long ears

are incompletely dominant to short ears so three types of ear may occur. "Stunted ears" also occur and are dominant to normal ears. Intersexuality is due to a recessive factor. A factor leading to shortening of the retractor penis muscle occurs in goats. The genetics of coat colour has not been worked out but true white is dominant to all other colours and black is probably recessive to all others.—R. PETER JONES.

HAGEDOORN, A. L., VERLINDE, J. O., & HAGEDOORN-VORSTHEUVEL LA BRAND, A. C. (1942.) **Progressieve cysteuze ontaarding van de glandulae cowperi bij de muis. [Progressive cystic degeneration of Cowper's glands in mice.]—*Tijdschr. Diergeneesk.* 69. 124-127 & 128. [English, French and German summaries.] 1237**

The authors describe a type of cryptorchism, due to mechanical obstruction of the inguinal canal, in a strain of inbred white mice. The affected animals remained fertile for some time. The condition resulted from a progressive cystic degeneration of Cowper's glands. Starting with an hypertrophy and hyperplasia of the glandular epithelium; the increased glandular activity resulted in a retention of the secretions and distension of the lumina. Vacuolation of the glandular cells resulted. As the cell degeneration progressed the intracellular granules disappeared and the nuclei became pycnotic. The end result was a cyst filled with a gelatinous mass. As the glands increased in size they protruded from the pelvis and appeared as symmetrical or asymmetrical swellings at the root of the tail. The morphological changes are illustrated by excellent photographs and photomicrographs.

The authors carried out matings, crossing affected and unaffected with apparently unaffected individuals of the same strain, and also crossing affected and unaffected members of the inbred strain with unrelated individuals. They conclude that the condition is transmissible and recessive.—P. L. LE ROUX.

WILSON, S. G. (1946.) **The seasonal incidence of calving and of sexual activity in zebu cattle in Nyasaland.—*J. agric. Sci.* 36. 246-257. 1238**

In 1942 a census scheme made notification compulsory of all births, deaths and other changes in herd size. The cattle population consists almost entirely of shorthorned zebu cattle, indigenous to the country and native owned. Conditions of animal management are such that any seasonal increase in calving rate reflects increased sexual activity, while the state of nutrition depends on the season of the year. The area considered, the Central Province of Nyasaland

lies south of the equator. Details are given of temperature, rainfall, humidity, etc. Birth rates are given as crude birth rates per 1,000 head of the population. The records show that calving tends to be seasonal, the majority of calves being born in June to September. Despite the limitations of the data certain deductions are possible. Conceptions resulting in live births are more pre-

See also absts. **1102** (proteins in pregnancy); **1116** (vitamin content of colostrum); **1171** (sulphanilamide and semen); **1221-1223** (placental permeability); **1224, 1225** (ovary and ovulation); **1226, 1227** (spermatozoa).

ZOOTECCHNY

PRAWOCHEŃSKI, R. (1946.) Aktualne zagadnienia współczesnej zootechniki. [**Modern zootechny problems.**].—*Med. Wet.* **2**. 174-177. [Abst. from French summary.] **1239**

Priority in selection of breeding stock should

See also absts. **1099** (palatability of herbage); **1233** (pregnancy diagnosis).

TECHNIQUE AND APPARATUS

SWIFT, H. F. (1946.) Modern techniques for studying hemolytic streptococci.—*Bull. U.S. Army med. Dep.* **6**. 428-434. **1240**

The agglutination method of typing is more confusing as the "T" substance of several types is closely related and thus cross-agglutination is frequent.

Human beings infected with one type of group A streptococcus are protected against cross-infection by homologous types but are still susceptible to heterologous types.

Dealing with chemotherapy, certain types are known to be more resistant to the action of sulphonamides than others and this emphasizes the need for early typing in treating a streptococcal infection. Typing is also important in deciding whether an epidemic is present, since in a hundred people, twelve streptococcal infections each of a different type would not be serious whilst the reverse would be the case were they all of the same type. A person eliminating streptococci should not be classified as potentially dangerous until the organism has been typed. Characters possessed by avirulent strains are listed.

Emphasis is laid on the many chronic infections which are produced by streptococci. These may be overlooked because of the spectacular results with antibiotics in acute infections.

—C. D. WILSON.

valent in October and November when the temperatures are high, the humidity low and the pastures are dried up and woody. As far as can be judged there is no significant difference in the numbers of male and female births. The present birth rate is high enough to maintain the stability of the cattle population.—A. A. WILSON.

be given to freedom from heritable disease, longevity and fecundity rather than to conformation. Additional data are necessary in stud books if they are to be of value to breeders.—J. H.

GABE, M. (1947.) Sur l'emploi du picrate de vert de méthyle pour la différenciation de la coloration d'Altmann. [**Use of methyl green picrate in differentiating Altmann's fuchsin stain.**].—*Bull. Histol. Tech. micr.* **24**. 5-9. **1241**

To prepare methyl green picrate solution, equal parts of saturated aqueous solutions of methyl green and of picric acid are mixed. The precipitate is filtered with distilled water and dried in the incubator. A saturated solution is then made by dissolving it in pure methyl alcohol. The tissue is saturated with Altmann's fuchsin dehydrated in alcohol and counterstained with the methyl green picrate.

G. discusses the rationale of the method and the reasons for failure in its application that may be obtained. There are six photomicrographs.

—L. M. MARKSON.

LANGDON-DAVIES, J. (1945.) A new anti-corrosive.—*Canad. med. Ass. J.* **53**. 508-504. **1242**

A new substance, AC 10, developed by the Manchester oil refinery in England. Cataract knives, which do not survive five minutes' boiling in 2% soda solution, have been boiled for days in the same solution to which 2% AC 10 has been added. Sterilization of these delicate, high-carbon steel knives was considered the most trying test to which AC 10 might be put.—R. G.

BOOK REVIEWS

HARROW, B. [Ph.D., Professor of Chemistry, City College, College of the City of New York]. (1946.) **Textbook of biochemistry**. pp. xiii + 594. Numerous figs., tables and refs. Philadelphia: W. B. Saunders. 4th Edit. 22s. **1243**

The latest edition of this book is one of the

best introductory treatises on the subject and not only deserves a place in every biochemical library, but should appeal to students and research workers in related subjects who are desirous of acquiring a sound working knowledge of theoretical biochemistry. With the various biochemical fields.

developing as they are, two of the functions of a textbook on the subject are to present the many controversial topics in an unbiased but critical manner and to be a guide to the more detailed monographs and reviews. This has been achieved to a considerable extent, although there are occasional instances where some caution might have been exercised in weighing largely unsubstantiated evidence against well-established work, particularly in amino acid metabolism. The lists of reviews and important papers given at the end of each chapter have been well chosen and will be of great help to those wishing to refer back to the original literature. Selected publications concerned with experimental techniques, for example, the use of isotopes in intermediary metabolism, have also been included. Bibliographies, unless carefully pruned, can easily become an embarrassing encumbrance, but the reviewer feels that with certain aspects of biochemistry emerging as distinct entities, as detoxication has done, there is much to be said for drawing together the appropriate literature. Metabolic antagonism, discussed in the chapters on vitamins and immunochemistry, is a particular example. While it might be unwise in a book of this nature to treat this subject apart from the various branches of intermediary metabolism, duplication of the relevant references in a separate group would have greatly assisted in its consideration as a general metabolic process.

Criticisms of the printing are the relative pooriness of the plates and the apparent complexity of several of the sets of equations, in particular, part of the anaerobic breakdown of glycogen on page 324 and Braunstein's scheme of transamination on page 354. Slight modification of the setting of the type would have made these diagrams much easier to follow.

The introductory chapters on the chemistry of fats, carbohydrates and proteins are good. The value of this section would have been considerably enhanced if an elementary treatment of surface activity, the characteristics of monolayers and the permeability of membranes had been added. Insufficient emphasis seems to have been paid to this aspect of biochemistry, as evidenced by the all too brief chapter on absorption. There is little discussion of the chemistry of enzymes and the specificity and mechanism of their action. Together with the absence of a full account of the functions of inhibitors, poisons, activators, protectors and co-enzymes, this contributes to making the chapter the least satisfactory of the book. Some specific criticisms are the questionable need for dividing calcium and phosphorus metabolism between chapters on the chemistry of the tissues and inorganic metabolism,

the absence of a discussion of nitrogen balance and its relation to the essential amino acids, and the lack of emphasis placed upon the dynamic interchange between dietary and tissue protein and the rate of this process. One error which might confuse students is "the formation of taurocholic acid from cholic acid and glycine" on page 235.

As an orthodox textbook, it is informative, reliable and stimulating.—G. A. MAW.

OLONOVSKI, M. [Professeur de Chimie Médicale à la Faculté de Médecine de Paris, Membre de l'Académie de Médecine]. (1947.) Exposé annuels de biochimie médicale. Septième série. [Annual review of medical biochemistry. Seventh series.] pp. 285. Paris: Masson et Cie. Fr. 560. 1244

This volume, which is the seventh in a series of reviews in French on biochemical subjects relating to medicine, comprises nine articles on a wide range of topics. The subjects dealt with are: (1) chemical and pharmacological aspects of the ergot alkaloids, (2) glucuronides, (3) biochemistry of antigens (especially bacterial antigens), (4) lecithinase and cholesterol esterase, (5) synthetic oestrogens, (6) enzyme estimations in pathological chemistry, (7) biochemistry of cobal. (8) adrenalin and adrenalinaemia, (9) biogenesis of organic compounds. For readers of the *Veterinary Bulletin* probably the most interesting article is that dealing with the biochemistry of cobalt and the subject is exhaustively reviewed with a very extensive bibliography.—A. EDEN.

BALDWIN, E. [B.A., Ph.D.; University Lecturer in Biochemistry]. (1947.) **Dynamic aspects of biochemistry.** pp. xiii+457. 34 figs., 27 tables. Numerous refs. Cambridge: University Press. 21s. 1245

The older conception of the subject of biochemistry was that of a science borderline between organic chemistry and biology with an emphasis on clinical problems relating to medicine, in effect, what is now termed physiological chemistry.

Despite the changed outlook, most modern textbooks of biochemistry are still modelled on the basic principles of physiological chemistry. In the present work B. has sought to change the emphasis by approaching the subject from the dynamic aspect and has conveniently assembled a great deal of information that the student normally gathers only after lengthy perusals of original literature. Though written primarily for students reading biochemistry for Part II of the Natural Sciences Tripos the work will certainly appeal to a much wider range of readers.

The work broadly is divided into two parts, enzymes and metabolism. After an introduction to the general behaviour and properties of enzymes, the nature of the catalytic process is considered,

followed by discussions of hydrolases and phosphorylases, oxidizing and other enzymes. On metabolism consideration is first given to the methods employed in intermediary metabolism, then to food, digestion and absorption. Chapters are devoted to the general, special and excretory metabolism of proteins and amino-acids. Special aspects of the metabolism of nitrogen and purine derivatives, the aerobic and anaerobic metabolism of carbohydrates and finally the metabolism of fats are dealt with. A good selected list of references to original works, reviews and specialized textbooks is given as a guide to further reading, and the whole work is thoroughly indexed on both subject and author classifications.

Each chapter of the story is told clearly and concisely. Formulae and diagrams are well set out, and equations for chemical reactions are often given in a pictorial manner that impresses itself on the memory of the reader. B. is an experienced teacher and no doubt much of the clarity of expression derives from difficulties experienced by students under his tutelage. As a result of his experiences he has compiled a work which should have a wide appeal, not only to students but to research workers in cognate fields and not a few professing biochemists will find much of interest and profit to them in the simple unfolding of the story of many fundamental processes of life treated from the biochemical aspect.—A. EDEN.

FANNETT, H. [Technical Director, Glyco Products Company Inc.]. (1947.) **Practical emulsions.** pp. xvi + 568. 9 figs. Numerous refs. Brooklyn, N.Y.: Chemical Publishing Co., Inc. \$8.50.

1246

This work on emulsions treats the subject from the practical angles, touching but lightly on the theoretical and physico-chemical aspects. Many of the formulations given for specific purposes have been obtained by rule-of-thumb methods, and have stood the test of long usage and countless experiments; they are quoted without any attempt at scientific explanations of the procedure. Although the subject of emulsions has attracted and still is attracting the serious attention of numerous scientific workers to-day, both from the fundamental and the applied point of view, their making is still more of an art than a science, and their importance in so many activities of modern industrial undertakings is sufficient to justify the author's attempt at assembling so much valuable information in a relatively small compass.

This work is divided into three parts. The first gives general information on such topics as types of emulsions, emulsifying and emulsifying agents, foams, wetting and dispensing agents, and includes extensive lists of these products. The

second consists of a symposium of short papers on various emulsions and emulsifying agents whilst the third part is devoted to the numerous industrial and commercial applications of these products. The general reader of the *V. B.* may not find equal interest and value in all chapters; his interests will more probably be concerned with the uses of emulsions in agricultural sprays and medicinal preparations, but there is much of an educational value in this third part.

The whole work is a miniature reference library on the subject and is extremely readable. All formulations are clearly set out and the book is well indexed. It should give interested readers much pleasure and profit, and at the same time prove to be a valuable source of information on the subject for several years to come.—A. EDEN.

CANTAROW, A. [M.D., Professor of Physiological Chemistry, Jefferson Medical College], & TRUMPER, M. [Ph. D., Lt. Commander, H. (S), USNR, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.]. (1936.) **Clinical biochemistry.** pp. xvi + 647. 29 figs., 22 tables. Philadelphia & London: W. B. Saunders Company. 3rd Edit., revised. 8vo. 32s. 6d.

1247

In compiling this book the authors have attempted to bring the wide knowledge of the expert chemical pathologist within the range of understanding of ordinary clinicians and student. The main purpose is to explain how the results of biochemical tests should be interpreted, and with a few special exceptions the techniques of laboratory methods are not discussed. Much care and thought appears to have been given to the arrangement of material, and to the adequate use of cross references. The first chapters review the behaviour of individual metabolites in the clinical conditions in which each one is affected. Thus the metabolisms of carbohydrates, proteins, lipoids, Ca, P, phosphatase, Mg, Fe, S, and I are each discussed under separate headings. A chapter dealing jointly with Na, K and Cl is next included. The method of treatment is then changed, and chapters follow upon various biochemical, physiological or pathological subjects, such as water balance, acid-base balance, respiratory exchange and basal metabolism, vitamins, diabetes mellitus, renal function, nephrosis, hepatic function, gastric function, pancreatic function, cerebro-spinal fluid, and the biochemical changes in pregnancy and lactation. Hormone assay and endocrine functions are treated separately in a long chapter specially contributed by A. E. Rakoff. Finally the metabolic abnormalities which occur in each of 24 pathological states are listed, with appropriate references to the detailed treatment of each item in the preceding chapters. Tables of normal values, and

an exhaustive index with about 8,000 page references conclude an impressive and painstaking work.

In dealing with matters of nutritional interest a reasonably high standard is generally maintained, although the choice of topics and references seems occasionally to be somewhat arbitrary. One minor error appears to occur on page 316 where it is stated that the administration of large doses of vitamin A and carotene to healthy subjects can give rise to their excretion in the urine. On the other hand no mention is made of the remarkable excretion of vitamin A in the urine in pneumonia, chronic nephritis and certain other diseases. It would be ungenerous, however, not to excuse a few imperfections in a book of such a wide scope.

The present edition includes much new material; some thirty new topics are discussed, and the chapter on hormones is also an innovation. It should amply repay its price to all interested in chemical pathology in its application to nutrition.

—T. MOORE.

HARVEY, W. C. [M.D., D.P.H., F.R.San.I.; Medical Officer of Health, Borough of Southgate], & HILL, H. [F.R.San.I., A.M.I.S.E., F.S.I.A.; "Olsett" Gold Medallist 1932]. (1948.) **Milk products.** pp. viii + 343. London: H. K. Lewis & Co., Ltd. 2nd Edit. Numerous illustrations. 30s. 1248

The second edition of this book brings the text up to date, special attention having been paid to changes in legislature and new methods of production. In the preface the authors state that it is "a practical handbook which attempts to set out in reasonably concise form the various ancillary uses to which milk may be put, and to describe the processes of manufacture, together with desirable methods of control". The commodities considered are ice-cream, cream, butter and margarine, cheese, condensed, evaporated, and dried milk, and subsidiary products, a chapter being devoted to each. The chapters have been compiled on a standard plan, and deal with the composition, food value, and manufacturing processes, of each product, and give the chief methods of bacteriological and chemical examination, and a summary of the legislative control. The photographic and diagrammatic illustrations are clear and plentiful.

There are no lists of references, but extracts from the literature are introduced into the text.

—J. O. L. KING.

— (1948.) **Handbook on poultry diseases.** pp. 176. London: National Veterinary Medical

Association of Great Britain and Ireland. 2nd Edit. 17 plates. 6 appendices. 1249

The subject matter of this handbook originally published in 1937 has largely been re-written and brought up to date and the scope of this work has been considerably extended. The present-day organization of the poultry industry in Great Britain is briefly reviewed; the husbandry, breeding and feeding of poultry are succinctly dealt with and the method of conducting P.M. examinations is described.

The specific diseases are described in greater detail than in the first edition and, in addition, useful descriptions of erysipelas infection in poultry, psittacosis, salmonella infection and the diseases of chicks are now included.

The section on parasitic diseases has been little changed. The use of sulphamethazine in coccidiosis control has been added and the preparation and use of barium antimony tartrate in syngamiasis is described.

The section on nutritional and metabolic disorders has been considerably enlarged and a most interesting and concise account is given of the nutritional needs of the domestic fowl and of the effects produced by the commoner deficiencies.

A new section is devoted to poisoning in poultry. Other new sections deal with cleaning and disinfection of poultry houses and equipment and killing and dressing of poultry. The inspection of carcasses is described and details of the relevant orders affecting poultry and poultry products and scheduled diseases are also given.

Knowledge of poultry diseases has increased greatly in recent years and this new edition, summarizing adequately as it does recent advances, provides in small compass up-to-date information which will prove of great value to all veterinary surgeons connected with the poultry industry.

—D. LUKE.

HANCOCK, R. C. G. [B.Sc., M.R.C.V.S.]. (1948.) **The right way to keep dogs.** pp. 111. London: The Rolls House Publishing Co., Ltd. Numerous illustrations and tables. 5s. 1250

This small book is written for the dog-owner. It deals with breeding, training, showing, feeding and management.

There is a useful section on the law as it concerns dogs and hints are given on ailments and their treatment.

The approach is essentially rational and much of value has been compressed into a small space.

—M. C.

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications indexed for this purpose was included in *Index Veterinarius*, Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin*, Vol. 9, No. 1.

About 10,000 references are indexed each year, each reference being suitably cross-indexed alphabetically under subjects and under names of authors.

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